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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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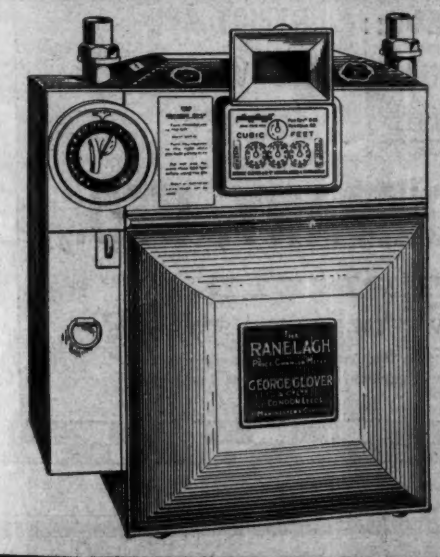

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EDITORIAL NOTES.

The Lay Press and the Gas Industry.

ONE cannot expect the lay Press to know everything about the affairs of the gas industry; but one does expect that the lay Press should exercise discrimination in matters about which it is not fully cognizant, and make sure of its facts before presenting them to the public. But that the daily and weekly papers are not, as recent evidence discloses, fully conversant with the affairs of the gas industry is not, it may be emphatically asserted, entirely their fault. The industry itself has been somewhat remiss in its methods of keeping the newspapers informed on topics that are essentially of public importance, or that become so through various causes. The singular thing about this laxity in the imparting of information is that there is not an industry trading in a public utility that has realized more than that of gas supply the influence of the public Press. But from the side of the industry this influence has been viewed more in its commercial aspect than in that of those collateral matters which adversely, or may adversely, affect the merit and popularity of its staple product. The industry has had a succession of sharp lessons in this regard—in respect of inerts, the introduction of the therm simultaneously with the unfortunate necessity for increasing gas charges, and the fact that carbon monoxide is an ingredient (and a useful one) of gas. All these matters have shown how essential to an industry such as that of gas supply is the power of anticipation—of being ahead of probable difficulties, and of getting into touch with the organs of public influence, and seeing that the responsible editors rightly understand, or are made acquainted with, them from the point of view of the industry itself.

Another lesson that these occurrences have offered to the industry is that the troubles have had inception in the London papers, and that more or less the provincial papers have followed the lead of the Metropolitan ones; and so the wave of misconception and misapprehension has run through the country. In our view, some of the money that is now expended on certain of the exquisitely printed literature of the "B.C.G.A.," which finds accommodation on the bookshelves of the chief officials of gas undertakings (who have available for themselves other sources of information), could be more profitably expended in the legitimate work of the Association by regularly sending to all the principal newspapers in the country information on gas topics that are, or that perspicacity suggests may easily become, matters of current importance and discussion. The coal industry week by week sends out comment (printed on two or three single-sided pages) on questions affecting its interests. Why should not the gas industry—perhaps not week by week, but month by month—do something similar? The technical Press of the industry can offer accommodation for all the information necessary for responsible gas officials as to developments of new gas-using appliances, and as to the selling methods and practices of enterprising undertakings. This being so, the "B.C.G.A." could be relieved of certain of the work and thus expenditure which is incurred by them at the present time. We are not submitting this as a criticism of policy, but as a constructive suggestion for consideration. We know—acknowledgment was made in our issue for Jan. 17 [p. 134]—that the Association have distributed among the general Press copies of the volume "Teachers' Notes for Lessons on Gas," with a printed slip indicating such sections of the book as are deemed "likely to contain "facts useful to those journalists who may not be scientists, "but who may be called upon to comment on what is a "highly complicated and scientific problem." That is good, so far as it goes. But a volume of the kind may be deposited in a newspaper library with pious intentions to utilize it for future reference; but, among the multifarious books received, it may be its fate to be soon forgotten. The periodical receipt of two or three sides of printed comment and information which could be promptly digested would be far more effective.

These remarks are suggested by the fresh piece of service that the Gas Light and Coke Company have rendered to the gas industry in helping to inform the public Press of actualities concerning the affairs of the gas industry; and never was there a time when such service could better assist in tempering to facts the knowledge of journalists of the lay Press on matters that are vital to the trading interests of the industry. The example of the Governor of the Company (Mr. D. Milne Watson) and his colleagues should be followed by the responsible heads of all gas undertakings who consider that exact information among journalists who prepare reading matter for the consumption of the public is better than inexact, and therefore misleading, information. Not all undertakings have Becktons to show journalists, with all the impression that can be made by magnitude. But all gas undertakings have works in which there is tremendous educational scope for those who minister day by day to the reading public. To Beckton the Board of the Company invited representatives of the London Press; and after a lunch, and before making an inspection of the works, the Governor supplied the journalistic guests with particulars just of the type which, if brought by circular letter before newspaper editors, would make all the difference in their point of view. He was able to tell them how the therm is the basis of charge in the Company's trading with nearly 900,000 consumers; that the price per therm since the end of 1921 has been reduced from 1s. 2d. to 10d., and after March will be down to 9·2d.—a reduction of 4·8d. per therm; and that the 3s. 10d. per 1000 c.ft. which this represents is only 50 p.ct. above pre-war cost, while the cost of living index figure is 80 p.ct. These are the kind of figures that appeal to those who cater for the reading public. Our report also shows that the Governor gave information as to increased costs of manufacture. There was reference with sorrow to the loss of life at Bethnal Green, which was due wholly to an accident to a main through undetectable causes. Then there was a telling passage in which the Governor was able to state that in twenty-three years in the Company's area there had only been nineteen deaths from split mains, although they serve with gas some 4 millions of the population. There was comparison, too, with deaths from other risks. The relatively clean record of the industry is further attested by the fact that British gas undertakings have some 8 million meters in use, serving a population of approximately 40 millions; and last year there were 112 accidents—a large proportion of them being due to the carelessness of the consumers themselves. If the consumers would only help the industry, this excellent record could be made better still. There is no hiding the fact, nor any desire to do so, that gas is toxic. It always has been, and always will be. The fact, however, has not retarded its public service, nor the growth of recognition of its usefulness. Care in its application and use is, of course, necessary—just as much as care is essential in the use of motor vehicles, which cause many more fatalities in a year than gas. The Company

have printed a leaflet on this subject, which is given at the end of the article describing the Press visit to Beckton. Copies of this should be printed and sent out by every gas undertaking—not excluding the last paragraph: "If any "consumer of gas in the Company's district thinks his, or "her, fittings, apparatus, or other gas appliances require "attention, or are for any reason not satisfactory, the Com- "pany will, as always, gladly send a representative, free of "charge, for the purpose of inspection and advice." Another circular neatly explains the therm.

The work that the Gas Light and Coke Company did among the London journalists last Wednesday is all to the good. The benefit of the service then rendered will extend far beyond the Company's gas-supply area. We cannot offer better counsel to other gas undertakings than—"Go, and do likewise."

In Changed Circumstances.

There was an air of general contentment over the meeting of the proprietors of the Gas Light and Coke Company last Friday, notwithstanding the repeated attempts that have been made to blemish the reputation of the gas industry, with the Company in the foreground, and seriously to injure its interests. The proprietors, in large numbers, had come in that frame of mind, for the preliminary examination of the accounts had (it could not be otherwise) given complete satisfaction; and the statement made by the Governor (Mr. D. Milne Watson) established more firmly the good opinion that had been formed. In a gas company's accounts there are so many factors operating to help to make or to mar them, that one cannot nowadays form judgment other than on the general, final results. Last year, for example, bye-products lost heavily; but coal, oil, and other expenditure (as was seen in our review of the accounts a week ago) shed a substantial part of the heavy cost that was piled on them in the war period and after. Then during the year there was an 8½ p.ct. increase in the gas business, many new consumers were enrolled, and several thousands of gas-consuming appliances were connected. The general improvement in conditions, too, has enabled the price per therm to be reduced from 1s. 2d. at the end of 1921 to 10d. now; and from the end of March next, the charge will be 9·2d. In such circumstances, the view of the Governor that the Company may look forward, conditions being favourable, to a good extension of business at the reduced price, is well justified. That so many new consumers and appliances should have been realized during the time the industry has been so fiercely, but foolishly, assailed in the Press, is excellent testimony to the good sense of the major part of the public, and to the prevalence of the view that gas, used wisely and cared for, is an excellent servant, and that trouble arising from misuse is the fault of the consumer, and not of the gas. These matters were also dealt with by the Governor.

The successive reductions in the price of gas are among the outstanding features of the working of the Company during the year. The fact has given the consumers a large share in the returning flow of prosperity. The proprietors' part is the enjoyment of a dividend for the year of £5 4s. p.ct. At the present standard price per therm, the distribution could have been at the rate of £6 10s. 8d. p.ct.; but prudence is at the helm. The standard price was granted in 1921, when costs had a totally different complexion from those existing now; and it will always stand to the credit of the administration of the Company and of the stockholders that they did not take advantage of an opportunity provided by abnormal and incompatible circumstances unduly to reward capital and to swell market values. The likely result of such undiplomatic action would have been that the time would be hastened when revision of the standard price will be sought; and then, if successful, there would again have been a dropping of dividend and a fluctuation of market values—probably altogether inconsistent with the extent of the variation that may be made, sooner or later, in the standard price. Under the modified law, standard prices are to be movable up or down on satisfactory proof being advanced that economic conditions have changed sufficiently to warrant an alteration being made. But there will not be the same excuse for immediate action, nor the exercise of pressure, in revising standard prices if there is discretion in handling the question of dividend where the difference between standard price and actual charge admits of one being paid considerably in excess of the pre-war distribution. The pre-war payment, if of fair proportions, should afford a guide, but not necessarily a standard to be followed. For one must not forget what gas stock and share holders suffered during the war and for long after. They saw capital values and dividends dwindle to mere skeletons of their former states. The cost of living, too, is still high compared with pre-war times—this for stock and share holders, as well as for industrial workers. Furthermore, in commercial enterprises generally, new capital can command higher interest and dividends than before the war. Thus it is that the exercise of circumspection in deciding upon the dividend to be paid does not call for a too niggardly consideration of all the facts. In this instance, the £5 4s. is a prudent decision; and the proprietors, without the slightest hint at disapproval, accepted it as such.

For the Company the year has done something more. It has placed the concern in a much stronger position financially; and it is, or should be, easy for consumers and for stockholders alike to see that such a condition augurs well for the future. The Company have now liquid assets that were not possessed a year ago. At the end of 1921, a sum of upwards of three-quarters of a million was owing to the bankers. Now they have on deposit £400,000, and £207,364 invested. In view of the troubles in Europe, and the uncertainties of markets generally, these sums constitute an excellent assurance for the maintenance—at any rate, in the immediate future—of the present position of both consumers and stockholders. But the Governor has his eyes on something more than the mere maintenance of existing conditions. There is confidence in his words as to further improvement. Let us reproduce them: "In the past year, we have "sold more gas than ever before, and have had one of the "largest increases in the sale of gas appliances; and con- "sidering the national work that is being done by the gas "industry in the direction of coal conservation, smoke "abatement, and the production of useful bye-products, so "essential to the development of the country, there can be "no real fear for the future prosperity of this Company and "of the gas industry generally." Those words during the next few weeks will be quoted far and wide in the industry.

Policy and Results.

Results are the best test of the soundness of policy. The annual accounts of the South Metropolitan Gas Company—bearing in mind the continued depressed state of industry and trade—disclose results upon which the President (Dr. Carpenter), his directorial colleagues, the proprietors, the employees, and the consumers can all be congratulated. The results endorse policy, and are its justification. Thus it is the Directors are able and pleased to report that the gas supply of South London has been regarded with extended favour by the consumers, whose numbers and requirements have both increased. The quality and composition of the gas has been maintained at the pre-war standard; and the method of gas manufacture employed by the Company is stated to be "identical with that established half-a-century "ago, except that it is now practised with a greater under- "standing which a highly-trained, scientific staff has brought "to bear upon it." That is all true; but identical though the system may be fundamentally, the relative results per ton put a somewhat different complexion on the statement. Reading it, a layman might be pardoned for thinking that the Company had stood still in its methods, save for the refinements that the highly-trained, scientific staff had imparted to the process. It is something more material than this that has happened at the Company's works during the past half-century. Another point is that complaints relating to gas bills have not increased compared with the numbers of preceding years. This is a matter for gratification in view of the recent newspaper agitation, which (speaking generally of the industry) has been shown to have been baseless, with pretensions totally unrepresentative of the actual state of things. However, the inquiry that has been held by a Departmental Committee, it is pointed out by the Board, has been useful, in that it has drawn attention to the widespread use of gas for household lighting, for which many prefer it to any other form of illuminant. Incidentally, too, it is mentioned that shop lighting by high-pressure gas continues to increase. The Board also claim that their policy in extending the Company's interests in the manufacture of fittings for use in the district is increasingly justified. "It provides consumers with the opportunity of obtaining "tested and efficient appliances, instead of having to rely

"upon a market flooded with apparatus generally uneconomical and sometimes dangerous." The terms of the condemnation are sweeping—and as such, in our opinion, are undeserved. The inference that may be drawn is that there is little of the gas apparatus on the market that can be used economically; and that inference would not to-day be justified. Probably it would have been a few years ago. But we agree that there is shoddy material on the market which is dangerous; and it is the duty of all gas undertakings to do everything possible to prevent its use. We refer particularly to the cheap brackets, pendants, &c., which are seamed, and not made from drawn tubes. There is also ill-designed heating apparatus which is not made by the industry's recognized responsible manufacturers.

During the whole of the year, the consumers in South London enjoyed cheap therms—that is to say, cheap relatively to the charges of immediately past years, and not to the pre-war standard. Up to midsummer the price was 11½d. per therm, and since then 10d., which figures compare with 10½d. up to midsummer of 1921, and 11½d. in the second half of that year. The price is now 9d.; and the Company are trading with straight coal gas of a declared value of 560 B.Th.U. Despite the average lower charge for the year, the income from gas increased, by £29,260, to £3,459,633; and the rents of meters, stoves, and fittings went up, by £10,000, to £360,116. In the increased business there is justification for the claim of the Board as to the extending favour in which gas is held. The therms sold totalled to 81,340,985—an augmentation of 2,789,871, or 3·55 p.ct. To meet the additional business, 27,067 tons more coal were carbonized than in 1921; the total being 1,225,042 tons. The quantity of therms put into the holders was 86,601,151; but of this, 56,255 therms were bought from H.M. Fuel Research Station, which gives a net production from the coal carbonized by the Company of 86,544,896 therms. This is equal to 70·64 therms per ton of coal; while in 1921, the production was 69·9 therms. Thus an improvement in working by about ¾ therm per ton contributed to the satisfaction of the enlarged demand. All the items under manufacturing costs (save an addition of £3333 to repairs and maintenance) have been reduced, with the result that expenditure on manufacture—£2,841,341—is lower by £707,927. The chief contribution was coal, which, costing £1,903,790, showed a reduction of £650,398. But a set-off to this is the lower yield of the bye-products—the £1,067,148 received being below the sum realized in 1921 by £416,101. Coke was the greatest loser. It contributed to the revenue £759,335, or £368,708 less than in 1921. The result is that the net cost of coal last year was £836,642, as contrasted with £1,070,939 in 1921, or a decrease of £234,297. In the other items of expenditure, there were some notable variations. For example, the item of public lamps shows a reduction of £21,765; rents, rates, and taxes are less by £30,776; while miscellaneous charges have almost doubled—£146,966, compared with £74,750. But two items alone will about account for this considerable increase: The superannuation, sick, and accident fund has had £32,142 added to it; and there is an appropriation from revenue of £39,000 for the special purposes fund. The total expenditure was £4,149,716, or a reduction of £677,730; the income amounted to £4,891,619, or less by £376,449. The result is that the balance carried to net revenue account is £741,903, or an improvement of £301,281.

This, however, does not reveal the whole of the financial tale of the year. It has been a year in which there has been a clearing away of financial encumbrances. In the balance-sheet it is seen that the suspense account of £200,000 for imported coal has been liquidated; and on the other side a temporary loan of £320,000 has also disappeared. We can felicitate the employee co-partners upon being once more in receipt of their bonus, the consumers upon their enjoyment of (in the circumstances of the times) a reasonable price per therm, and the proprietors upon the fact that the surplus profits enable a dividend to be paid upon the ordinary stock of 5½ p.ct. per annum, less the amount of the interim payment. Thus the pre-war rate of dividend is reached for the first time since June, 1914. All concerned in the working of the Company have contributed to these gratifying results. Although the world-wide demand for coal arising out of the uncertain position of the mining industry in America and Germany has stiffened the English coal market, and has for the present deferred the reduction of coal prices to an economic basis, the recovery of further prosperity, as industrial and trade conditions improve, is well assured.

The Therm Inquiry.

THERE has never been in the long history of the gas industry a period that can match the past seven years or so for abnormal experiences. These experiences—financial, working, and constitutional, varied by unmerited assaults—have shaken the industry; but on each occasion it has recovered its equilibrium, and has continued its progress, despite the more onerous conditions created by war time and subsequently. Fundamental change, too, has been effected by the Gas Regulation Act. Accompaniments to this change have been inquiries by Departmental Committees—in three parts; and yet, forsooth, a fourth is required for the purpose of upsetting the findings in one of the three! The therm inquiry is the third; and as reported in the "JOURNAL" a week ago, the last of the evidence has been heard, and the industry now awaits with placid confidence the report and recommendations of Sir Clarendon Hyde and his colleagues on the Departmental Committee. The members of this tribunal have throughout been thorough and patient, and have shown a complete grasp of the issues involved. In five sittings they have taken a mass of evidence which, so far as we can trace, has not left a single phase of the subject unexamined. There has been some departure from the precise limits of the reference to the Committee—just sufficient for them to explore every side-issue presented, in order that they might be satisfied as to whether or not it had any actual bearing. But when convinced that it had not, then the Chairman cut the matter short by declaring the view of the Committee that they were not concerned with it. This, for example, was the case in such matters as the attempt to drag in the question of the validity of the standard prices per therm allowed, and the allegation that the therm had been used to camouflage increases in the price of gas. If half the assertions were true that have been levelled against the gas industry during this high gas accounts and therm agitation and inquiry, then there is only one conclusion to which the Committee could possibly come, and it is that the administration of the industry has been entrusted to a remarkably fine accumulation of imbeciles. But the industry's magnificent development attests the fact that technical competence and commercial ability have directed it.

We have said that the Chairman of the Committee and his colleagues have shown much patience. They have done so particularly in listening to representatives of consumers who fancied that they had good cause of complaint. It can never have been the lot of any Committee to have to hear accusation more groundless or constitutionally weak, nor requests which they, if not their authors, must know are absolutely impracticable if a great public service is to be conducted to the utmost advantage to the community. And moreover the Committee were informed of mysterious happenings—all due to the therm system! One witness told how he used to put a penny in his slot meter overnight for cooking his breakfast in the morning, and how all the gas which the penny should have represented had disappeared by the time it was wanted. Despite London County Council and Gas Referees' reports, a private consumer assured the Committee—and very gravely—that, under the therm, both the quality and the pressure of the gas fluctuated considerably. Another witness told of how through the treacherous therm his gas accounts soared up magnificently. Then the big secret was told him that, if he studied the regulation of his taps, so that the flames met his requirements, the consumption of gas would be reduced. He tried this wonderful remedy for waste, and there was an extraordinary decline in his accounts. More than one critic considered the apparatus supplied by the London Gas Companies altogether out of date for the qualities and the pressures of gas supplied—knowing, of course, nothing as to the range of variation (if it exists) that can be negotiated by the burners in the apparatus and the gas-taps. But the Committee can apply to such evidence the test of results from scientific investigation. They have heard much of this. They have heard of the results from men whom they have had before them, and of whose qualifications for making the tests they have had the means of forming some judgment. They can also apply the tremendous mass of unexpressed evidence of contentment. Extravagant views and ideas, however, have come not only from the amateur in these matters; there are ultraists in gas affairs, as well as in political and social. But intelligent men have no difficulty in detecting and in separating that which is practical from that which is otherwise; and the Committee may be relied upon to do this.

There was nothing wanting in the final day's proceedings that the gas industry could have desired. Even those who came along on the opposition side (if so it can be truly called) advanced evidence of a character that was distinctly in favour of the therm. In fact, the much-derided therm has been accepted throughout the inquiry as a sound basis for charging for gas; but some of those who describe it as sound would still prefer the charge on the cubic feet basis —not that they know a cubic foot any better than a therm. But the "therm" is the name of a comparative stranger; there is familiarity in the description "cubic feet." We cannot, however, get away from the fact that there is something quite illogical in the request, if (as is frankly admitted) the heating value of gas is the best and most uniform basis upon which to do business. There is one thing certain, that it is the only basis that has, or can have, consistency throughout the country; and this is one respect in which the Gas Regulation Act is going to produce real co-ordination in the industry, and at the same time help it to do the best possible under its economic conditions, however much they may vary as between one district and another. Dr. Carpenter, at this final day's hearing, maintained at a high level the case of the gas industry in defence of the therm—if it really required defending; and in this he was ably supported by Mr. R. W. Edwards and Mr. Samuel Tagg. There was abundant evidence for the Committee in the output returns of gas undertakings to show that the therm had not been the means of inflating accounts. Some gas companies have shown normal increases, others actual decreases, in output with the therm system in operation. They had similar experience under the cubic foot system. The members of the Committee must have been highly amused as they listened to the evidence, and remembered the insouciant and hare-brained statements of the "Daily Mail" and the "Pall Mall Gazette." The therm is far more stable to-day than it was before the inquiry; and we shall hear very little more as to its unsuitability as a basis for gas business. It will require no Act of Parliament to annul what was done by the Gas Regulation Act. Dr. Carpenter is a strong champion of the therm; and, in his opinion, it will not be long before the public generally will be as much accustomed to it as to cubic feet. We can well believe this. Naturally a change of this kind requires time for its establishment in the minds of the people. One does not expect a seed sown in the evening to germinate during the night, and be a flourishing plant by the morning. But in connection with the system, Dr. Carpenter suggests methods and new policy, which are already practices in some cases, but not in all. His view is they should be universal; and we see nothing difficult in making them so, for they are in the interests of gas suppliers and consumers alike. On receipt forms handed to slot consumers, the thermal value of the gas should be stated, as well as the cubic feet and the therms consumed. But he does not want to see "cubic feet" perpetuated. Retention is wise for a time; but the day will come when it will be a superfluity. Such receipt forms he would like to see made compulsory, and, in the case of ordinary consumers, the use of meter cards.

Naturally, Dr. Carpenter had something to say about fixed adjustments for burners; and this was followed by a suggestion that every gas undertaking should be required to test and adjust the whole of the apparatus they supply on hire or hire-purchase. With this there can only be agreement, because no one can adjust gas appliances to obtain the highest efficiency so well as the officials of the gas undertaking concerned under its own particular conditions of supply. Dr. Carpenter is a stickler for high standards; but it cannot be expected that the manufacturers of gas appliances, who have to test for efficiency in the gas-supply district in which their works are situated, can send out their products adjusted to all conditions of supply. Therefore, the obligation of testing and adjustment should be upon the gas undertakings that purchase the goods. But there is another charge, which, coming from Dr. Carpenter, must be taken seriously. He asserts that it is a fact that 60 p.ct. of the value of the appliances goes back to the manufacturers because, for some reason or another, they are inaccurate or defective; and he added to this the statement that it is exceedingly difficult to get manufacturers of apparatus and appliances required by gas undertakings to maintain their goods at a high standard of quality. The manufacturers may have some comment to make on this point, in view of the fact that they have so considerably extended their technical staffs for the express purpose of realizing higher efficiencies, and maintaining and improving the quality of their products. In fact, there has been general acknowledgment that in both respects—in efficiency and quality—the manufacturers have, without external aid, effected advances that leave present-day goods so far in advance of those of not many years since, that comparison would be simply ludicrous. There were many other interesting points in Dr. Carpenter's evidence—such as his references to the therm meter, and the expression of his opinion that the supply of gas in the Metropolis is of such great importance, and on such a large scale, that any change with regard to the principles upon which it is carried out and continued should only be as a result of inquiry by Parliamentary Committees, and not by the Board of Trade. As a matter of fact, the Board cannot deal with principles and policy other than within the limits of the powers conferred upon them by Act of Parliament.

Coal-Tar Pitch and Patent Fuel Making.

THE South Wales Patent Fuel Manufacturers' Association are in a quandary with respect to the price and the supplies of coal-tar pitch. There has been a reduced output, road authorities are using more and more in the construction and repair of roads, and, in these circumstances, the law of supply and demand has come into operation, and the price has risen considerably. Before the war the patent fuel manufacturers could get supplies at about 40s. per ton, while latterly they have had to pay prices in the region of 135s.—an increase of 237 p.ct. The reduced output, of course, is due to various causes—principally the fewer coke-ovens in operation, and, to a smaller extent, the increasing number of gas-works that are making water gas, or have adopted complete gasification plant, and so are carbonizing somewhat less coal. Of course, the Government cannot in peace times interfere with the operations of one industry, in order to satisfy the requirements of others. Nor can the Government, if coal-tar pitch is the best available substance for road authorities to use, forbid them to do so, in order to satisfy the patent fuel makers. And certainly there can be no meddling with the price. But the patent fuel makers' assert that the conditions threaten to bring about an entire stoppage of their industry; and so they have appealed, by deputation, to the Roads Board of the Ministry of Transport, to see that steps are taken forthwith to curtail the use of pitch on the roads. That is the method they propose to bring about a reduction of use, and therefore of price. We agree that the position of the patent fuel industry is important. In South Wales, for example, the potential output of patent fuel is 4 million tons per annum, and works are nearing completion that will increase the productive capacity by a million tons. But the demand for patent fuel is declining, owing to its cost in comparison with other fuels. Even so, we cannot admit the right of the industry to any preferential consideration. Every effort has been made, in this country and abroad, to find another binder for briquette making; but so far coal-tar pitch is the only agglomerant in general use. The matter has been pressed upon the Roads Board as one of extreme urgency; and Sir Henry Maybury has promised to report fully to the Ministry on the subject, and to consider the advisability of communicating in regard to it with the road authorities throughout the country. He could promise no more than this; but one cannot see that there can be any interference in the matter in favour of one class of purchasers, with the sole view of depressing the market values.

Chemists as Gas Examiners.

The chemical institutions of the country are indulging in a little wrangle among themselves over the competency of their members for the gas examinerships that are going under the Gas Regulation Act. It will be remembered that the Institute of Chemistry and the Institute of Physics made representations before the Departmental Therm Committee as to the appointment of their members to fill these positions. They showed good "push" in getting before the Committee, and pressing their point. But the other chemical associations are not by any means disposed to let the two Institutes in question secure any preferential place in this matter. If the counsel of the Gas Referees is heeded—assuming their views are represented by the disinclination of Mr. W. J. A. Butterfield (when before the Committee) to agree to the two Institutes having superior claims—the other organizations have nothing to fear in this matter. There has been correspon-

dence on the subject in the "Chemical Trade Journal." One letter is by Mr. G. Watson Gray, F.C.S., F.I.C. He says: "Quite a considerable number of chemists belong to the British Association of Chemists; and they are certainly as fully capable of testing gas as those belonging to other centres or institutions." The Secretary of the Liverpool Section of the Association (Mr. Francis W. Kay) states that "the Association is doing its utmost to ensure fair play to the members of the profession who are fully qualified to act as gas examiners, though not fellows or associates of the Institute of Chemistry." Mr. Arnold Merrick points out that the whole of the technical schools and colleges are competent to train men for gas measurement. He puts the whole case in a nutshell when he says: "What is at issue is not the competency of the Gas Referees or the public good, but how far the Institute of Chemistry can secure for its members the exclusive rights to the chemical work of the country." We have lived long enough to know that the most competent men for a job do not necessarily belong to any particular professional organization; and so we should be sorry to see the gas examinerships become the preserve of any one body.

Low-Grade Gas and Storage.

It was a thoughtful address which the President of the Yorkshire Junior Gas Association (Mr. H. L. Bateman, of Wakefield) delivered at their last meeting. It treated of the economic factors of gas production and distribution. There is a great divergence in the character and incidence of these economic factors, owing to the great divergence that there is in the conditions of gas undertakings. Hence the differences of opinion that exist between gas engineers as to what contributes to or constitutes the most economical working. Men's opinions on this subject are guided very much by their own individual circumstances and experiences. However, to obtain the maximum economical and therefore profitable working, it is necessary to exercise careful supervision and control over each section of existing plant. That is one of the points of the address. Of course, the new method of selling gas on the thermal basis offers large opportunities for the future; but the start in improving working to realize low priced therms must be made at the point at which each concern stands to-day, and progress to higher efficiencies must be effected as opportunity permits of the adoption of new plant. Mr. Bateman's wise survey is well worth study by all those who are seeking to improve working results. It will be seen that he is in favour at present, without binding himself in respect of the future, of a 500 B.Th.U. gas. His choice of this value was, in the discussion, contested by Mr. C. H. Chester, who, in his industrial area, finds that 400 B.Th.U. gas is a better proposition than 500 B.Th.U. It was in replying to Mr. Chester that Mr. Bateman made a remark which strikes us as being rather strange. He was referring to his experience with two complete gasification plants; and he states that, as the result of a good many tests, he has found that gas so made has an awkward habit of dropping its value after a few hours' storage. Other experimenters have found that, in the distribution of high-grade gas, the losses are greater than with low-grade gas. Why, therefore, gas produced by complete gasification should have an awkward habit of dropping its value after a few hours' "storage," is a point upon which it would be interesting to have further explanation. What reason does Mr. Bateman assign for this?

Household Coal and Gas Prices.

In London last week, some of the more popular classes of household coal were raised in price by 1s. to 2s. per ton. This is unwelcome news for householders; but simultaneously the Gas Light and Coke Company announced that from the end of March gas would be sold by them at 9·2d. per therm. This is very near the lowest existing charge in London and the neighbourhood—9d. per therm. Such close prices did not always obtain between the London Companies on the cubic feet basis. For room heating, coal at 49s. per ton is really no better for the householder than gas at 9d. per therm. At the price mentioned for coal, about 2d. per therm is paid; but as only about 20 p.ct. of the heat is usefully transmitted to a room, as compared with 75 p.ct. in the case of an efficient gas-fire, the householder requires 3¾ therms in coal to give to a room a corresponding amount of heat. That would cost 7½d. But the maintenance of the coal fire when not actually required costs money; and, in addition, there is the labour and the dirt from which there is complete escape when using gas.

Sulphate of Ammonia Orders.

British farmers who are holding back their orders for sulphate of ammonia had better look alive, or they will have to pay a higher price for their requirements. The British Sulphate of Ammonia Federation have been pursuing a liberal policy towards home agriculturists, and are continuing to do so. But, of course, there must be in business matters some limit to generosity. The Federation now announce that they are willing to book-up at the February price, to the extent of the available production, all orders received by Feb. 24 for delivery during March, April, and May. After the date named, the price for March-May delivery will be raised by 5s. per ton—making it £17 3s. for neutral quality, in fine friable condition, free from lumps, and 25¾ p.ct. ammonia. The ordinary conditions (as will be seen by the notice elsewhere) apply to this price.

Taxation and Industry.

The gas industry suffers considerably, in company with other industries, from the burden of taxation. Being a statutory public utility, however, it has the satisfaction of being exempt for a period from the iniquitous Corporation tax. The reduction of the income-tax last year no doubt helped industry; but the burden is still repressing trade revival. The Federation of British Industries are actively moving in pressing for a reduction of taxation in order to give encouragement to efforts to revive trade. A deputation from the Federation, headed by Sir Eric Geddes, has waited upon the Chancellor of the Exchequer to urge their claims in this respect. The case for the abolition of the Corporation tax was presented; and it showed the fundamental injustice of the tax. In regard to income-tax, it was pointed out by Sir Eric that the matter of local rates must not be forgotten. This, of course, becomes of particular importance owing to the revaluation of property that is taking place at the present time, which in all likelihood will in many cases increase the amount of local rates to be paid by industrialists in future. The effect of this revaluation on the income-tax payable under schedules "A" and "B" is of the utmost importance; for it may easily in many cases discount the relief given by the reduction of 1s. in the pound granted last year, and conceivably even increase the burden in some instances. This emphasizes the demand which has come from all the industrial areas in the country for a further reduction in the rate of income-tax. It is confidently anticipated that the sooner taxes are brought within reasonable limits, the sooner will something approaching normal prosperity return to industry. This the gas industry devoutly wants to see in order to regain its industrial load. The deputation also urged the Government to devise some means whereby co-operative societies shall contribute their proper quota of taxation.

More Profitable Coal Mining.

The return of the Mines Department relating to production proceeds, and profits for the September quarter shows a considerable improvement in the financial results of the coal-mining industry. In the June quarter, there was a net deficit for all districts combined of £34,685, representing a loss of 0·17d. on every ton of coal sold; but in the three months ended Sept. 30 last, the aggregate net surplus was £2,907,681, representing a profit of 1s. 1d. per ton. Six areas, including the principal coalfields, showed surpluses ranging from 7½d. to 2s. 3d. per ton; and seven returned deficits, of which the lowest was just under 4d., and the highest exceeded 3s. 9d. Of the total production of 58,717,767 tons, 53,694,293 tons were available for export and home consumption; and on the basis of this last figure, the aggregate net costs worked-out at 17s. 2·08d. per ton, while sales at the pit-head realized 18s. 3·08d.

Compensation to Workers.

Owing to the higher wages ruling, the total payments under the Workmen's Compensation Act have largely increased, although in recent years the number of claims has declined. High-water mark was attained in 1920, when the aggregate compensation paid in the seven principal groups of industries was £5,978,000. In 1921, when unemployment increased and wages began to fall, the total declined to £5,509,395; but the decrease was by no means commensurate with the decline in the number of cases. In 1913 there were 3748 fatal and 476,920 non-fatal cases—the

compensation amounting to £595,012 in the fatal cases, and to £2,766,638 in the non-fatal ones. In 1921, the last figure was considerably greater. The fatal cases were down to 2385, and the non-fatal ones to 283.361; but the compensation in the fatal cases amounted to £518,064, and in the non-fatal ones to £4,991,331. These figures represent only the actual amount paid to the workmen or their dependants, and not the total charge on the industries. Including the legal, medical, administrative, and other expenses, the aggregate outlay in respect of the 285,746 cases in 1921 can hardly have been less than £8,500,000. The £5,509,395 actually paid as compensation in the seven groups of industries works-out to 15s. 1d. per employee—the number employed having been 7,315,866.

PERSONAL.

Mr. HARRY KENDRICK, late Engineer and Manager of the Stretford Gas Company, has been appointed by Messrs. Thrutchley and Co., Ltd., coal and coke factors and shippers, as Sub-Manager of their gas-coal department. His headquarters will be in the firm's office at No. 22, St. Mary's Gate, Manchester.

Mr. WALTER SHADBOLT has vacated the Gas Managership at Fleetwood, on taking up duties in a similar capacity at Portland. Mr. Shadbolt has been at Fleetwood ten years—succeeding his brother, Mr. Sam Shadbolt, who, in turn, succeeded his father. There has, therefore, been a long line of the family associated with the Fleetwood Gas Company. Mr. Walter Shadbolt has seen many changes, and has introduced many improvements, at Fleetwood.

OBITUARY.

The death is announced of Mr. H. A. PEAKE, who had had a lifelong association with Sleaford, where he was held in great esteem. He was Chairman of the Sleaford Gas Company, a member of the Urban District Council, and held various other public positions.

EDUCATION IN THE GAS INDUSTRY.

Programme for a Joint Conference of the Institution of Gas Engineers and the British Commercial Gas Association.

A joint conference on education in the gas industry has been arranged by the Institution of Gas Engineers and the British Commercial Gas Association, and will take place next Wednesday afternoon, the 14th inst., at 3 o'clock, at the Institution of Mechanical Engineers, Westminster, S.W., under the Chairmanship of Mr. James D. Smith, President of the Institution of Gas Engineers. In sending out the following programme, Mr. Walter T. Dunn (the Secretary of the Institution) points out that the question of the education of the employees of the industry is one of interest and importance to all engaged in the direction of its affairs; and it is hoped to arouse widespread interest in the schemes now under consideration.

Opening of conference by the Chairman.

Address on "Some Educational Schemes in Operation," by Mr. R. W. FERGUSON, B Sc., Hon. Secretary of the Association for Education in industry and Commerce, and Educational Organizer to Messrs. Cadbury Bros., Ltd.

Presentation of the "Scheme for the Education and Certification of Gas Engineers" approved by the Board of Education and the Council of the Institution of Gas Engineers, together with an outline of a complementary "Scheme for Commercial Education in the Gas Industry," now in preparation by the British Commercial Gas Association in consultation with the Board of Education, by Mr. F. W. GOODENOUGH, Chairman of the Special Committees on Education of the Institution and the Association, who will move a resolution, which will be seconded from the Chair.

Speeches in support by two members of the Commercial Education Committee—Principal H. SCHOFIELD, B.Sc. (Technical College, Loughborough), and Mr. PERCY ALDEN, M.A. (Stapley Education Trust).

Discussion.

Durability of Refractories.—At the Society of Arts next Wednesday evening, at 8 o'clock, Mr. Walter J. Rees, Lecturer on Refractories in the University of Sheffield, will read a paper on this subject. Mr. H. J. C. Johnston, President of the Institute of Clay Workers, is to preside.

Gas Made with Molten Lead.—A new process to determine the gas content of coal by means of molten lead has, says the "Gas Journal of Canada," been developed for laboratory purposes. A known quantity of the coal is submerged in a vessel filled with molten lead, and kept at the desired temperature. The heat of the lead releases the gas in the coal; and the gas then emerges from the lead, and rises into a bell-shaped vessel leading to a condenser and meter, by which it is measured. This process simplifies the testing of small quantities of coal for use in gas plants.

ELECTRICITY SUPPLY MEMORANDA.

THE electricity papers have been mightily pleased lately. Anything against gas, or that hints at favour for electricity, is a sufficient excitant. The present cause of pleasure is the instruction that the London County Council gave, at the instance of Mr. Morrison, to the Public Control and General Purposes Committees to consider and report as to whether or not legislative or other steps should be taken to prevent the distribution of "imperfect" gas, or the existence of faulty mains inside and outside houses; and, further, whether the electrical experiences of certain Borough Councils tend to show that gas is no longer necessary for the running of a house in respect of lighting, heating, and cooking. In view of this reference, the "Electrical Review" presents its readers with a paragraph headed, "Is Gas Out of Date?" The "Electrical Times" makes brief allusion to the matter under the title "The Crisis in the Gas Industry;" while the "Electrician" considers that the London County Council are doing the Electrical Development Association's job, and consequently is much elated over the electricity industry having the Council as an ally. The reference has not yet produced a report. The Committees in question have a big task before them—much larger than merely expressing the opinion that, because a comparatively few electric cookers have been installed, and a number of electric radiators, gas can be done without. Apart from the qualification of the apparatus for meeting public requirements, there are certain technical and financial obstacles in the way, as well as some consideration of the national position in relation to the coal resources. The electricity industry has been trying to push heating and cooking for a great many years. If electricity for these purposes possesses such extraordinary merit, there should have been a substantial shrinkage in the 1,104,552 gas-stoves that the three London Gas Companies had on hire at the end of 1921; but, instead of this, the number persists in increasing. The Gas Light and Coke Company's report for last year shows that, in its district, the number of stoves sold and let out on hire was raised by 78,943. Of these, 14,000 were taken over in connection with the transfer to the Company of the Ilford gas undertaking; but even so, this gives in the case of this one Company 65,000 additional stoves connected in twelve months. The public will say whether or not gas is any longer necessary; and not the County Council, nor the electrical papers. The "Electrician" is bold. It says that the County Council inquiry "will bring out that 'gas is no longer necessary' in the home, because electricity can do all that gas can do, and do it much better." Then why the public favour for gas? The gas companies cannot compel the public to take gas, or their gas fires or cookers. Yet the stream of adoption flows on, and at a more rapid rate than in the case of electricity. The "Electrical Times" takes a more intelligent view. Of the inquiry it says: "Nothing very wonderful will come of it, of course; but the tale of adversity accumulates." We admit that it has not been an agreeable thing to be pilloried in the Press in the fashion of recent times. But the high gas accounts and therm agitation has been proved by inquiry to be without foundation; and the deaths from gas suffocation would not have reached the number they have done had it not been for the suggestion offered by the carbon monoxide agitators and the sensation-mongering of certain daily papers. If anyone ought to be censured, it should be the agitators and the newspapers concerned. There is no more carbon monoxide in town gas to-day than there has been in normal years during the past quarter-of-a-century; and much less than there was during the war and the coal strike of 1921. "Is Gas Out of Date?" The expansion of the business of the industry supplies the answer.

The Gas "Crisis."

Repair and Maintenance of Internal Fittings.

The "Electrician" also welcomes the London County Council inquiry on the ground that, "if it does nothing else, it will show that the gas companies have neglected precautionary measures of repair and maintenance—measures which, if undertaken when they should have been, would have prevented the extraordinary succession of accidents that have culminated in this inquiry." Why the "Electrician" should welcome the inquiry on this ground is not clear. What does our contemporary mean by "neglecting precautionary measures of repair and maintenance?" All fittings and apparatus that are the property of the gas suppliers are repaired and maintained by them. But there is much private property in gas piping and apparatus over which they have no jurisdiction. Landlords and architects pipe houses as they think proper, and in those cases the gas suppliers' powers end at the meters, save in respect of hired apparatus. In such circumstances, how can gas undertakings be accused of "neglecting precautionary measures of repair and maintenance?" Some concerns are getting statutory authorization to prescribe and to supervise in respect of new piping and installations. We are afraid, however, there would be great resentment if, in connection with existing piping and privately owned apparatus, gas undertakings were empowered to order changes to be made. They can advise; but if their counsel involves new expenditure, the chances are that it will be turned down. When the purveyors of a utility

such as gas make recommendations which touch the pockets of householders, although for their benefit, it is extraordinary how often there is a suspicion of ulterior motive. The only course would be to try to induce Parliament to grant powers not only to prescribe and supervise new installations and changes in them from time to time, but to have the right to inspect existing private piping and fittings, so far as they are visible, and to refuse supply in cases where there is defect, or a probability of defect arising. This would be a very big thing, and an additional responsibility, as well as costly, especially in the case of large districts. But at present, as previously remarked, in all ordinary private installations, gas undertakings have no authorization to do anything beyond the meter. Because of this, there is complaint of insufficiency of supply, while it is the inadequacy of the piping that is to blame. Moreover, defects arise in private fittings, are neglected by the consumer; and then, if trouble comes, it is the gas that is at fault, and not the owner of the defective fittings, or the person who has been negligent. It is a pity the "Electrician" cannot look beyond its nose before attributing neglect to gas suppliers—or at all events, common sense ought to suggest to it that it should get to know something more about the subject prior to writing upon it.

A Public Lighting Decision Reversed.

In the "Memoranda" for Jan. 10, examples of proposed extravagant outlay for the conversion of street lamps were quoted; and the point was made that, at a far less cost, gas lighting can be modernized, with highly effective results. One of the cases instanced was Beckenham, where it was intended to expend £19,978 upon the conversion of the public lamps; and it was estimated that the annual revenue would be £4057, which, it was declared, would be "more than sufficient" to cover all costs, including capital charges, and provide a reasonable profit. We questioned the all-covering power of that sum of revenue. It is now learned from one of our electrical contemporaries that the District Council have reconsidered the position, and have decided not to make the change owing to the expense involved in the provision of the necessary mains. It is stated that, "since the figures for electric lighting became available, the Gas Company made a further offer—hence the turn-about." The Beckenham District Council have, financially, taken a wise step in rescinding their former resolution. Local authorities, like other people, cannot afford to be prodigal in these days.

Reorganization and Cheaper Supply.

Another trenchant letter from Mr. F. W. Purse, of West Ham, has appeared in the "Electrical Review," on the subject of the great expectations from electricity generation reorganization. Mr. Purse is not in sympathy with the preposterous claims that have been made in this connection; and he protests strongly against any one in the electricity industry bolstering-up those claims. He is among those who have studied this matter for years, and have been hard-up against all the details. Owing to this, he holds that it is evolution and not revolution that is required in the matter. But the idea seems to be to give to evolution such rapid growth that it amounts to revolution. He addresses the "Review" in very straight terms regarding its assumptions. The present distribution systems, he asserts, make it impossible, on account of expense, to execute the changes in London that our contemporary desires. Quite properly, he points out that anything that is done will be useless unless the consumer benefits; and he has waited in vain to see it proved at any of the inquiries which have been held that, as the result of the proposal, the consumer will be enabled to be supplied at a cheaper rate than hitherto. "Efficiency of generation," he adds, "may be screwed-up another point by some of the schemes; but when this gets watered-down through various channels to the consumer, he will not find the decimal point has shifted in his favour—there is all the possibility of its shifting against him." Mr. Purse later on accentuates this when he remarks that his opinion has always been that in the past, in their anxiety to get business, electrical engineers supplied current too cheaply, and did not have sufficient balance for development work. Here, again, he has not seen any figures put forward to show how the consumer will be supplied more cheaply in the future than in the past. That is the opinion of one with a wide experience of electricity generation and supply; and he considers it is quite time the clap-trap of "cheap and abundant" was dropped altogether.

Electricity at Wembley.

It looks very much as though the electricity industry will make an imposing display at the British Empire Exhibition at Wembley. The section will occupy an area of 200,000 sq. ft.; and it is being organized by the British Electrical and Allied Manufacturers' Association. The preliminary information states that the organizing minds intend to prove to the world that the capacities and resources of the industry are co-extensive with the Empire itself. There will be many exhibits of interest to the technical and non-technical visitor alike. Among other things, it is stated that women visitors will be shown what electricity can do for them in their homes. Electric labour-saving devices, electrical appliances for the preparation and cooking of food, washers, cleaners, irons, kettles, and the innumerable appurtenances of the modern home will be demonstrated in infinite variety. From one source alone, enough electric power to light a town of 100,000 inhabitants will be supplied to the Exhibition at Wembley. The Association mentioned above have offered to supply a temporary power station, the value of the plant for which amounts to about £130,000. The turbine station will be complete with switchboards and sub-stations. They are also prepared to supply additional generating plant, if required, amounting in value to upwards of £50,000. It is stated that the power generated in this station would light a 60-watt lamp every hundred yards on the road from London to Glasgow.

Units and Fuel.

In the second annual report of the Electricity Commissioners for the year ended March 31 last, there are some statistics respecting 433 generating stations belonging to authorized undertakers in Great Britain. In addition, voluntary returns were furnished to the Commissioners in respect of 103 generating stations owned by tramway and railway authorities or non-statutory undertakings. The total units generated during the year amounted to 4,884,666,038; the total amount of coal and coke consumed was 6,475,531 tons; and the total oil fuel used reached 145,541 tons. If the fuel oil is converted to its equivalent of coal, it is found that the average consumption of fuel per unit generated was equal to 3·05 lbs. Some undertakings generate with a consumption below this; others are far above.

In London and the Home Counties.

A return has been issued by the London County Council relating to the supply of electricity in London and the Home Counties Electricity District. This big district extends from Hertford and St. Albans in the north to Dorking and Reigate in the south, and from Windsor in the west to Gravesend in the east. In this big area there are 42 local authorities supplying electricity, and the same number of companies. The County of London is supplied by thirty local authorities and companies. The capacity of the generating plant in the larger area at the end of the year was 518,055 KW.; and there were 79,892 KW. of transforming plant in use by the receivers of bulk supplies. The local authorities owned 220,171 KW. of this plant; and the companies the remainder—the latter therefore having the greater part. The load factor of the local authorities was slightly superior to that of the companies—the figures being respectively 22·7 p.ct. and 20 p.ct. The total number of KW.-hours generated or purchased in the year (deducting intersales) was 820,455,018, to which the companies contributed 452,653,383. The sales amounted to 648,342,476 KW.-hours, or 79 p.ct. of the output—the companies 78 p.ct., and the local authorities 81 p.ct. The capital invested in the undertakings totalled to £33,976,372—*i.e.*, local authorities £12,359,596, and companies £21,616,776.

Cast-Iron Cutting by Oxy-Acetylene.

Some months ago, when the Wisconsin Gas and Electric Company were considering the advisability of installing Congdon patent scrubber standpipes (which was subsequently done), one of the first questions to arise was whether or not the alteration from the old style would necessitate extensive dismembering and rebuilding of retorts. There were 300 retorts fitted with cast-iron mouthpieces to be dealt with. It was not until an oxy-acetylene engineer described some cast-iron cutting done for another plant that the General Superintendent of the Wisconsin Company realized the possibility of utilizing this system in making the proposed installation of Congdon scrubbers. Experiments were conducted, and it was found that the necessary cutting could be done without dismantling any part of the benches and without setting-up strains in the casting. Cast-iron cutting is much hotter work than steel cutting; and it was at first thought that strains might result from the intense local heat of cutting on a casting of the form of those in question. This contingency was provided against by cutting without cooling the retorts. In this way, the normal operation of the retort provided adequate preheat throughout the casting. A temporary barrier of brick was set up inside the mouthpiece in line with the front walls of the bench, so that the operators should not be subjected to serious discomfort from heat in carrying out without haste work requiring special care. The bricks were faced with mortar, but were set in such a way that they could be easily removed after serving their purpose. A strip of asbestos board provided a supplementary heat screen. The cutting proceeded uninterruptedly, all obstacles being overcome without serious difficulty. The General Superintendent of the Company roughly estimates the saving effected by the use of this process at $8000.

London and Southern District Junior Gas Association.—An enjoyable afternoon is promised to those members of the Association who may be able to take part next Saturday in a visit to the Vauxhall works of the South Metropolitan Gas Company. The party are to assemble at the entrance to the works at 2.30. At a business meeting on Friday, the 23rd inst., at the Westminster Technical Institute, Mr. W. H. Warren, Assistant Engineer at the Shoreditch works of the Gas Light and Coke Company, will read a paper entitled "Retort Vacuum and Quality Control." Members are reminded that the date fixed for the annual dinner and concert is Saturday, March 3, at the Great Eastern Hotel, Liverpool Street.

SOUTH METROPOLITAN GAS COMPANY.

Annual Report and Accounts.

THE following is the report of the Directors of the South Metropolitan Gas Company for the year ended Dec. 31, which will be presented at the general meeting next Wednesday.

The Directors are pleased to report that the gas supply of South London has been regarded with extended favour by the consumers, whose numbers and requirements have both increased.

This is not surprising when it is remembered that, while in 1920 the method of charge was changed from the cubic foot to the therm basis, the quality and composition of the gas have been maintained at not less than their pre-war standards. The method of gas manufacture employed by the Company to-day is identical with that established over half-a-century ago, except that it is now practised with the greater understanding which a highly-trained scientific staff has brought to bear upon the subject. It is very gratifying to be able to state that complaints relating to gas bills have shown no increase over the small numbers received in previous years.

The report of the Committee recently appointed to inquire into the working of the therm basis of charge will be awaited with interest. Not a few among those who regarded the system with suspicion have now pronounced in its favour. The inquiry has been useful in at least one other direction, inasmuch as it has drawn attention to the widespread use of gas for household lighting, for which many prefer it to any other form of illuminant. Shop lighting by high-pressure gas in the busy marketing centres continues to increase.

In spite of the disturbance of the subsoil occasioned by the drought of 1921, which affected all underground conduits, including those of the Post Office and the Water Board, the unaccounted-for gas has been kept well down to the low limits hitherto reached. The policy of the Company in extending its interests in the manufacture of fittings for use in its area of supply continues to be increasingly justified. It provides consumers with the opportunity of obtaining tested and efficient appliances; instead of having to rely upon a market flooded with apparatus generally uneconomical and sometimes dangerous.

The world-wide demand for coal arising out of the uncertain position of the mining industry in America and Germany has stiffened the English market, and has for the present deferred the reduction of coal prices to an economic basis.

The proportion of surplus profits earned for the year is sufficient to enable a dividend to be paid upon the ordinary stock of 5½ p.ct. per annum; and the Directors recommend that this be paid, less the amount of the interim dividend. The pre-war rate of dividend will thus be reached for the first time since June, 1914.

After several years' omission, a co-partnership bonus has been credited to the weekly and salaried staff. The renewal of this feature of a co-partnership which includes not only capital and labour, but also the consumer, has been received with great satisfaction by the employees, whose devotion to the interests of the Company calls for the highest commendation.

Two Directors (Mr. Frank Bush and Mr. Kenneth Phipson Hawksley) retire by rotation, and, being eligible, offer themselves for re-election. Mr. Henry Thomas Manley has been elected an Employee Director. It will be necessary to elect an Auditor in place of Mr. Charles Mortimer, resigned; and Mr. George S. Fry, C.B.E., has signified his intention of submitting himself as a candidate for the vacant office. In recording the resignation of Mr. Mortimer, the Board desires to add its sincere regret at the severance of an association with the Company which has existed for the past fifty years.

CHARLES CARPENTER, President.

Offices: 709, *Old Kent Road, S.E.* 15,
Jan. 31, 1923.

The Accounts.

The following are the principal portions of the accounts accompanying the report.

The first two statements relate to the stock and loan capital. The former states that the ordinary capital issued prior to 1916 under the Company's various Acts, on which dividend is payable, is £6,609,895; and there has been issued under the 1916 Act £250,000 of 5 p.ct. redeemable preference stock. The loan capital account shows that the loan capital, the rate of interest on which is 3 p.ct., amounts to £1,895,445; and the redeemable 6½ p.ct. loan capital to £734,000.

The third statement is the capital account, which stands at £9,467,320. The items of expenditure are as follows:

Capital account to Dec. 31, 1921			£8,707,706 3 1
Expenditure during year to Dec. 31, 1922—viz.:			
Buildings, plant, and machinery	£5,326 5 0		
Mains and services	5,709 19 0		
Meters	4,130 8 6		
Stoves	9,069 3 1		
		24,235 15 7	
Total expenditure			£8,731,941 18 8
Balance			735,378 1 4
Total			£9,467,320 0 0

The net revenue account shows a balance of £440,946 applicable to dividends. The balances of the reserve, renewal, and special purposes funds stood as follows on Dec. 31 last: Reserve fund, £150,122; renewal fund, £48,173; special purposes fund, £138,791.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the year as follows: Coal, £186,908; coke and breeze, £21,858; tar, ammonia, and products, £204,380; and sundry plant and stores, £244,953. The figures this time last year were: Coal, £332,580; coke and breeze, £17,852; tar, ammonia, and products, £192,357; and sundry plant and stores, £345,573. A sum of £35,344, co-partnership bonuses and savings, has been deposited with the Company; and the total of the superannuation and guarantee funds is £244,824.

The following is the revenue account:

EXPENDITURE.

Manufacture of gas—			
Coal into store, including £8325 os. 7d. for London Port and tonnage dues	£1,903,790 14 9		
Purification	41,047 5 9		
Salaries of Engineer and Officers at works	90,480 2 4		
Wages (carbonizing)	222,050 13 2		
Repairs and maintenance of works and plant, less £6522 8s. 9d. received for old materials	583,972 12 9		
		£2,841,341 8 9	
Co-partnership fund		34,463 0 0	
Distribution of gas—			
Repair, maintenance, and renewal of mains and service-pipes	£184,183 6 11		
Salaries and wages of officers, including rental clerks	113,143 15 2		
Repair and renewals of meters	134,148 10 6		
Repair and renewals of stoves	181,695 17 9		
Repair and renewals of gas-fittings	148,839 12 4		
		762,011 2 8	
Public lamps, labour and materials £63,589 13s. 8d., less £52,528 6s. 7d. received for the same		11,061 7 1	
Rents, rates, and taxes—			
Rents payable	£3,110 17 7		
Rates and taxes	149,531 12 4		
		152,642 9 11	
Management—			
Directors' allowance	£6,133 13 0		
Salaries of Management Staff	27,643 7 9		
Collectors { Ordinary	20,043 12 10		
Collectors { Slot meter	72,384 19 2		
Stationery and printing	22,785 1 10		
General charges	52,015 4 1		
Company's Auditors	225 0 0		
		201,230 18 8	
Miscellaneous—			
Law charges		682 8 7	
Parliamentary charges		117 12 0	
Bad debts		3,735 9 1	
Stolen from 337 slot meters broken open		177 11 6	
Superannuation, sick, and accident funds		74,753 14 2	
National Insurance Act charges		24,238 18 8	
Gas Referees and Official Auditor		2,260 11 11	
Special Purposes Fund		39,000 0 0	
Leasehold renewal fund		2,000 0 0	
Total expenditure		£4,149,716 13 0	
Balance carried to net revenue account		741,903 1 8	
		£4,891,619 14 8	

RECEIPTS.

Sale of gas—			
Midsummer, at 11½d. per therm	£1,830,985 10 6		
Christmas, at 10d. per therm	1,557,385 1 9		
	£3,388,370 12 3		
Public lighting	71,262 7 9		
		£3,459,633 0 0	
Meters at rent	£120,870 9 2		
Stoves and fires	100,512 0 2		
Gas-fittings	138,734 5 0		
		360,116 14 4	
Bye-products—			
Coke	£759,335 8 7		
Breeze	12,535 6 3		
Tar and products	193,974 12 9		
Ammonia and products	101,303 3 3		
		1,067,148 10 10	
Rents receivable		4,459 17 0	
Transfer fees		261 12 6	
Total receipts		£4,891,619 14 8	

Statement of Coal.

In Store Dec. 31, 1921.	Received during the Year.	Carbonized during the Year.	Used during the Year.	In Store Dec. 31, 1922.
Tons. 183,957	Tons. 1,175,605	Tons. 1,225,042	Tons. 1751	Tons. 132,769

Statement of Bye-Products.

Description.	In Store Dec. 31, 1921.	Made during the Year.	Used during the Year.	Sold during the Year.	In Store Dec. 31, 1922.
Coke—tons	16,817	752,678	158,677	589,788	21,030
Breeze—tons	1,671	127,100	68,249	58,264	2258
Tar—gallons	529,835	11,301,577	11,321,475	9,842	500,095
Ammoniacal liquor—butts	10,860	446,402	444,892	..	12,370

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Therms. 86,601,151*	Therms. 1,835,458	Therms. 79,505,527	Therms. 82,577,980	24,953

* Includes 56,255 therms received from H.M. Fuel Research Station.

INVESTIGATING LIGHT PHENOMENA.*

EVIDENCE is given of the activity of the Nela Research Laboratory in a bulletin which we have received from the General Electric Company, of Cleveland, Ohio. Although concerned, for the most part, with research of more import to the electrician than the gas engineer, this publication contains much interesting material for careful study. Many have discovered the practical value of pyrometrical observations, and will be interested in the Morse optical pyrometer which has been adapted to a wide range of laboratory uses by W. E. Forsythe. Another subject dealt with is the visibility of radiation. A number of extensive investigations on this subject has been made in recent years; and the published results show a large degree of variation in the values for the extreme ends of the spectrum. In certain phases of optical pyrometry, it is important that values of the visibility of radiation, of a fair degree of accuracy, should be available.

Abstract No. 75 is a summary of the work done by L. W. Hartman upon the visibility of radiation in the blue end of the visible spectrum. This follows upon the work of Hyde and Forsythe, who investigated the red end of the spectrum. Abstract No. 76 outlines the experimental investigation of the brightness of a black body as a function of its temperature, where the relative brightnesses as determined experimentally are compared with the corresponding relative values computed from the energy curves as given by Planck's equation and visibility data. Abstract No. 81 summarizes the results obtained in an investigation of the Purkinje phenomenon in the fovea, in which it was impossible to detect the slightest trace of this effect when fixation was accurately maintained. Another subject of general interest is that of "retiring" and "advancing" colours. It is shown by the data obtained that colours do actually "retire" and "advance"; and that, in general, blue is retiring and red is advancing. It is stated that a complete explanation can hardly be justified on the basis of present data, but that it appears possible that the different refractive indices of the eye media for radiant energy may play a part in causing this effect. Abstract No. 83 deals with the effect of bright surroundings on foveal vision—a subject of importance to all illuminating engineers, whatever the source of light may be.

Another section of the abstract-bulletin is one concerning the influence of brightness and colour upon flicker-photometer frequency. The tendency of the gas industry to-day is to concentrate more fully upon the efficiencies of various types of apparatus; and before placing a large order for any new burner, it is advisable to check its performance on a photometric bench, so as to make certain that the claims of the manufacturers are not exaggerated. Any research, therefore, which results in greater accuracy in these observations is of value to the gas engineer. The general conclusion drawn from this work is that flicker-photometer frequency is related to the characteristics of the alternated colours by definite quantitative laws; the forms and constants of these laws for various combinations of colours offering promising material for inferences concerning details of the visual mechanism.

Investigation is also recorded of the influence of the distribution of brightnesses over the visual field on the time required for discriminate responses to visual stimuli. The purpose of this study was to ascertain whether the time required for visual discrimination is a sufficiently sensitive and reliable index of visual performance to serve as a means of evaluating the relative merits of different lighting systems. The book contains, in all, thirty-five abstracts of research work covering a wide field.

* Abstract-Bulletin of Nela Research Laboratory, National Lamp Works of the General Electric Company, Cleveland, Ohio. Vol. I. No. 3.

The Pont-à-Mousson Foundries (France).

The Company wish to advise their numerous customers that in order to obviate the results of any decreased supplies of coke from the Ruhr district, all necessary steps have been taken, and contracts for coke supplies placed in England at high prices in order to get preferential deliveries. There is no truth in certain reports published by wrongly-informed persons that the Pont-à-Mousson Company's works have temporarily closed-down. Only elementary measures to economize in coke have been taken; and the position of the Company as regards deliveries and conditions is unaltered.

Up-to-Date Cookery.

We have received an excellent little cookery-book compiled by Mr. R. Gamble Marks, of 54, Zetland Street, Southport, which should prove of value to those who are in the fortunate position of possessing a gas-cooker. Containing over two hundred recipes of a variety calculated to meet the requirements of all, it also deals with the management of a gas-cooker, and many kitchen hints not generally known. Written by a specialist, this little book should appeal to the efficient housewife, who will probably find the "time-table for cooking" not the least interesting section. Two other useful features of the contents are a cooking encyclopædia full of information, and a list of meats, poultry, fish, and vegetables which are in season, for each month of the year. The price of the brochure is 1s.; by post 1s. 3d. Copies can be obtained from the author at the address given above.

PRESS MEN AT BECKTON.

Further Reduction in Price by the Gas Light and Coke Company.—The Removal of Misunderstanding.—National Importance of the Industry.

The Directors of the Gas Light and Coke Company have decided again to reduce the price of gas, as from the taking of the meter indices in March, by 0·8d. per therm—in other words, to reduce the price from 10d. to 9·2d. per therm, or 3s. 10d. per 1000 c.ft. This welcome announcement was made by Mr. D. Milne Watson, the Governor and Managing Director of the Company, in the course of a luncheon last Wednesday, which followed an inspection of the Beckton Gas-Works by an interested party of Press representatives. He pointed out that 3s. 10d. per 1000 c.ft. was not much more than 50 p.ct. over what the gas was costing before the war, while the index figure for living was 80 p.ct.

FACTS WHICH THE PUBLIC SHOULD BEAR IN MIND.

Important as this intimation is to the Company's 895,012 consumers, it was only one of the important things that Mr. Milne Watson had to say; and the other matters possess even wider application. He referred to all that the industry did during the war, and to the fact that it rendered equally valuable services in peace time—by saving labour in the home and in industrial processes, by smoke abatement, by the conservation of the national coal supply, and by the production of many things of inestimable value. The industry, he said, was aiming at a great social ideal—a community of interest of consumers, shareholders, and labour through the medium of the sliding-scale and co-partnership—the bonus to the staff and workmen being at the same rate on their salaries and wages as the shareholders' dividend.

But, Mr. Milne Watson went on to say, notwithstanding its services to the nation and its contributions to the economic development of the country, the industry has been subjected to a great deal of criticism, due chiefly to misunderstanding. In common with others, the gas industry had felt the full effect of rising prices, which necessitated an increase in the price of gas. Anonymous letters—some not wholly disinterested—were sent to the London Press, suggesting that the therm was responsible for the increased charges. The therm had nothing at all to do with the price of gas; it was simply a measure of heat, and was absolutely fair. Under the therm system, consumers paid only for what they required—namely, heat—in the gas. The therm, like the electrical unit, was a standard, and he thought it would be admitted a less complicated standard.

During the war the increase in the price of the Company's gas was lower than the increase in the price of coal, oil, and labour, reaching a figure only 73 p.ct. above pre-war, though coal increased by over 100 p.ct., oil by more than 500 p.ct., and labour by nearly 150 p.ct. After the war the price of gas rose further, owing to the fact that the revenue from residuals dropped seriously and suddenly. The price of gas, however, had now come down, and was still coming down.

Nobody could be more deeply sorry for the accident that had happened recently in Bethnal Green than the Directors of the Gas Light and Coke Company; but the facts of the case must be fairly considered. When he told them that there had been only 19 deaths in 23 years from split mains for a Company who served four millions of people, they would agree that this was an extraordinarily good record, and that nothing could have caused fewer accidents. Of course, all gas was toxic. It was merely a question of degree. By reducing the proportion of water gas at present used in admixture with coal gas, a slightly less toxic product could be supplied; but it would result in higher cost. Care was always necessary in the use of gas. No odourless gas had been, or ever would be, supplied.

The number of accidents due to gas compared most favourably with those arising from other agencies. Death by gas represented about 2¼ per million per annum of the population; deaths from railway accidents, 22 per million per annum; and street accidents in London represented 100 deaths per million per annum of the population. Fatalities from coal-fires were many times more numerous than from gas. In the year 1919 (the last year for which the Registrar-General's complete figures were available) no fewer than 992 inquests were held on children under five who had been fatally burnt through accidents with fires (conflagrations excluded). There were 8 million meters in use, serving a population of approximately 40 millions. There were 112 fatal accidents last year—often due to the carelessness of the consumers.

The industry recognized the importance of a cheap gas, and of the supply, skilled installation, and regular maintenance of proper fittings and appliances. During the war there was no possibility of renewing appliances to the extent the industry would have desired; but this matter was now well in hand. Every appliance was properly tested before going out; and adjusted on installation. The industry was constantly taking steps to bring up-to-date the appliances in use by their consumers.

THE GREAT VALUE OF THE GAS INDUSTRY.

The national importance of the gas industry was further emphasized by Mr. Jacques Abady, who declared that the attacks which had recently been made upon an indispensable industry were most unfair.

THE THERM MYSTERY EXPLAINED.

The therm, of course, was much discussed during the day; and while at table, the visitors were afforded an opportunity of studying the following explanation:

WHAT IS A THERM?

It is a measure of heat; it is 100,000 British thermal units.
Coal is the great primary source of heat.
Both gas and electricity are produced from coal.
One ton of coal contains 300 therms.
One unit of electricity contains 1-30th of a therm.
One thousand cubic feet of gas supplied by the Gas Light and Coke Company contain 5 therms.
It is heat that gives light, warmth, and power, whether you use coal, electricity, or gas.
So when you buy gas by the therm you buy what you want, and you buy what you use—heat.
A therm of London gas for lighting costs 10d.; less for power.
A therm of London electricity for lighting costs 17s. 6d., and for power about 5s.

ON THE WORKS.

The visitors were shown first of all the carburetted water-gas plant; and then they were taken over some of the 60 miles of railway on the works, by several of the 40 locomotives employed, to the pier head, and thence to one of the retort-houses. This portion of the proceedings terminated in the research laboratory, where had been set out a magnificent display of products derived from coal tar. At the chemical works of the Company about 17 million gallons of tar and 55 million gallons of ammoniacal liquor are dealt with annually.

FOR THE RE-ASSURANCE OF THE PUBLIC.

In order to reassure some of their customers, the Company are circulating among them a leaflet in these terms:

No Change.—The Company have made no change in their methods of manufacturing gas, either as the result of recent legislation or for any other reason. They supply a mixture of coal gas and carburetted water gas which contains no greater proportion of carbon monoxide than there was in the mixed coal and carburetted water gas supplied pre-war.

No "Odourless Gas."—No "odourless gas" has been, or ever will be, supplied. Gas smells as strongly as it ever did, and the slightest escape is immediately noticeable. Escapes receive prompt attention—day or night.

No Increased Danger.—There is no greater danger now than formerly; but common sense and ordinary care are, and always have been, necessary.

Assistance Free of Charge.—If any consumer of gas in the Company's district thinks his, or her, fittings, apparatus, or other gas appliances require attention, or are for any reason not satisfactory, the Company will as always gladly send a representative, free of charge, for the purpose of inspection and advice.

OPTICAL METHODS IN CONTROL AND RESEARCH LABORATORIES.*

THE process of gas manufacture is no longer carried out by rule-of-thumb methods, but is conducted on the scientific lines which its nature demands. The application of the study of light to works practice is not new; but its potentialities are by no means exhausted. The study of the relationship between the temperature of a body and the radiation of energy in the visible spectrum led to the use of the optical pyrometer as a means of determining accurately the temperature of a setting. A booklet, issued by Messrs. Adam Hilger, Ltd., draws attention to the importance of optical methods in the chemical control of various processes; and it outlines briefly some of the applications of spectrum analysis, refractrometry, and polarimetry.

The refractive index of a substance is a specific physical property, which is utilized in the gas interferometer as a means of analysis. The accuracy of the instrument is in direct ratio to the length of the gas chambers, and varies between 0·02 and 0·3 p.ct. The technical applications of such an instrument are many, and include its use as a method of indicating imperfect ventilation of the atmosphere, regardless of the cause of contamination. It may also be employed as a means of determining the degree of carburization of water gas carburetted with benzol. Another of its uses lies in the analysis of ammonia in distillation gases. A common task in gas analysis is the determination of flue gases for the purpose of boiler-control or in regenerator settings, and the gas interferometer has been applied to this end.

The idea of the booklet is to serve as an outline of the real utility of optical methods; and it should prove of interest to those to whom progress and efficiency mean more than mere words. The subject is dealt with broadly, and does not concern itself with any one branch of technical industry; but among other applications may be mentioned the analysis of mixtures of benzol and alcohol, the detection of fatty oils in mineral lubricating oils, and the presence of naphthalene in impure benzol.

Divided into four sections, the first deals with metallurgical and analytical applications of spectroscopy, and points out the extreme delicacy of spectroscopy in revealing the presence of minute quantities of impurities in substances. Impurities in raw materials and finished products are often a source of annoyance when their detection involves delay and costly analytical work, and the manufactures of many products are subject to great help from spectroscopic investigation.

Section II. outlines the value of absorption spectra; and section III. reviews some of the uses of the refractrometer. The final section concerns the polarimeter and its applications to various industries, and to the study of biological processes. Perhaps the most important feature of this small volume is the wealth of references given upon the various aspects of the subject.

The works' chemist requires an instrument which will give accurate results in a minimum of time; and there is no doubt that optical methods furnish a means to this end.

* "Optical Methods in Control and Research Laboratories." London: Adam Hilger, Ltd., 75A, Camden Road, N.W. 1. (Price 1s. 6d.; post free, 1s. 8d.).

BRITISH INDUSTRIES FAIR.

With reports current on all sides of improving trade conditions, the greatest interest is being taken in the forthcoming British Industries Fair, the ninth of an unbroken series, to be held from Feb. 19 to March 2. As usual, the fair will consist of two sections, running concurrently, in London and Birmingham. The former, which is organized by the Department of Overseas Trade, is confined mainly to light goods, such as chemicals, fancy goods, stationery, and pottery; while the Birmingham Section, organized by a joint Committee of the Municipality and the Chamber of Commerce, will display heavier commodities, such as engineering stock, hardware, and tools. The British Industries Fair is entirely self-supporting; all costs of construction, maintenance, and publicity being borne by the exhibiting firms.

We have to acknowledge with thanks an advance edition of the London Section catalogue, a book of easy reference, admirably bound and indexed, and containing alphabetical lists of exhibits in eight languages. On the face of it there is not great scope in the London Section for the gas industry, though the stands, which represent a multitude of home manufactures, should be a happy hunting-ground for the makers of industrial gas plant. However, in the "Chemicals and Allied Products" section we recognize the names of several firms well-known in the gas industry; and exhibits of illuminating and laboratory glassware will be of interest to gas men who are able to visit the Fair.

The nature of the Birmingham Section offers much wider scope for the manufacturing side of the gas industry to bring the excellence and utility of its products before the public; and of the opportunity full use was made in 1922, as recorded on p. 567 of the "JOURNAL" for March 8 last. We have not yet seen the catalogue of this year's display, but trust that the trading results of the 1922 Fair were satisfactory enough to warrant as full a representation of our interests. All will join in hoping that the success of the enterprise will again be complete, and that the widespread belief that "things are better" will be supported.

"Business Building."

The above is the title of a new publication of a popular character which is to be issued by Sir Isaac Pitman & Sons, Ltd., in twenty-six fortnightly parts. Each section is written by an acknowledged expert in the subject. Section 3 of Part I. concerns the lighting of shops, offices, warehouses, and factories, and is contributed by Mr. J. S. Dow—a well-known authority on lighting matters. In this, mention is made of the marked advance which has taken place in the design of gas-fittings. The suggestion is also submitted that consumers should seek the advice of the local gas company with regard to the arrangement of lights, &c. The first part of this very useful publication ends with a section dealing with industrial heating and ventilation. The aim of the series is to enable the reader not only to avoid the mistakes which have been made in the past, but to profit from the knowledge which has been gained by the leading men in business at the present day. We congratulate the publishers generally upon the production, and wish it success. "Business Building" may be obtained from any bookseller, or direct from Sir Isaac Pitman & Sons, Ltd., Parker Street, W.C. 2. The price of each part is 1s.

"Earthing" by Gas-Pipes.—Referring to what they term a dangerous wireless practice, the "Manchester Guardian" say: A lightning storm in London might have serious effects upon the property—if not the persons—of many wireless experimenters. Some of them are reported to be using gas pipes and brackets to connect their "earth wires." The practice is not encouraged by the broadcasting authorities; but many people have adopted this simple method of establishing an "earth." A prominent official of the South Metropolitan Gas Company remarked: "We shall firmly discourage the practice. The proper point with which to connect in order to get a really good earth is the water-pipe. The gas-pipes do not afford a good connection. Any expert will tell you that." The official pointed out that to connect with gas attachments was attended by some danger. In the event of the aerial being struck by lightning, the shock would be communicated to the gas system, the meter might be destroyed, and an explosion follow. It was a very dangerous thing to do. The official added that his Company had circularized the members of the staff instructing them to report any cases which came to their notice.

LIME CONSUMPTION IN SULPHATE OF AMMONIA MANUFACTURE.

A Useful Chart for Plant Control.

By HAROLD J. HAILSTONE, F.C.S., of Rochdale.

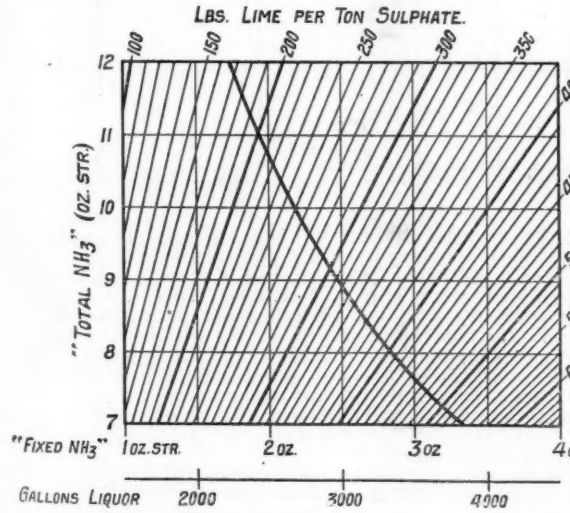
IN the efficient control of continuous processes for the manufacture of sulphate of ammonia, and the working-up of ammonia liquors generally, in the gas and coking industries, every attention must be given to the use of sufficient lime, and to the prevention of loss of ammonia in the waste effluent liquors. Obviously it is very necessary in the first place to know the quality and quantity of the raw liquor consumed each hour, shift, or day, in order that the requisite amount of lime may be carefully regulated to ensure a slight and constant excess. So far as the rate of the liquor feed is concerned, this may be determined by calibration of the feed-tank, or by the use of some form of sight-feed regulator. By this means an approximately constant flow within desired limits can be readily obtained.

The volume in gallons of liquor required for the production of 1 ton of sulphate (assuming minimum plant losses) is 5770 ÷ percentage of total ammonia in the liquor: or, alternatively, 26,700 ÷ total ozs. strength. The amount of lime required in this production to liberate the entire fixed ammonia content depends upon the proportion present; and a formula which provides for a 20 p.ct. excess, to allow for impurities in the lime, and for a working excess in the distillation, may be given as follows:

$$\text{Lbs. of lime required for production of 1 ton of sulphate} = \frac{1140 \times \text{fixed ammonia content}}{\text{Total ammonia content}}$$

(In this case it is immaterial whether the ammonia contents are expressed in percentages or in ozs. strength, so long as the same unit is used for both fixed and total ammonia.

These formulæ can be conveniently expressed graphically; and in the chart given below the information has been worked-out, and is clearly shown in a concise form.



From this chart the correct rate of liquor feed and lime addition can be quickly ascertained for a given output, using liquors of all strengths between 1 oz. and 4 oz. fixed ammonia and 7 oz. to 12 oz. total ammonia. It can be quite easily adapted for percentage values, and extended to any desired range to suit special local conditions.

Thus, to find the amount of liquor and lime required for the production of a ton of sulphate from a given liquor, read the total ammonia strength at the side, trace along to the curve, and from this point read off the gallons on the base line. The lime figure is obtained by tracing the point of total strength from the side until meeting the fixed ammonia line from the base. The point of intersection is read off on the diagonal, and gives the lbs. of lime to be used in the working-up of the amount of liquor already found, in order to yield a ton of sulphate.

Hence for a 4-ton per day plant dealing with a 10·5-oz. liquor (with 2·8-oz. "fixed") it would be necessary to use 2533 gallons of liquor and 304 lbs. lime per ton of sulphate produced; and this works-out at 422 gallons of liquor and 50·7 lbs. of lime per hour.

Though these figures are based on the theoretical reactions, *plus* a working excess, they should not be greatly differed from on a well-controlled plant; and comparisons should be made from time to time, and any divergencies investigated and accounted for.

Midland Junior Gas Association.—A paper on "Experiences of Vertical Retorts" is to be read by Mr. J. Poulson, of Stafford, at a meeting of the Association in the Council House, Birmingham, on Thursday, the 15th inst.

SCOTTISH JUNIOR GAS ASSOCIATION.

(WESTERN DISTRICT.)

Visit to the Works of Messrs. Peebles & Co.

Upwards of sixty members of the Western District of the Association journeyed to Edinburgh last Saturday week, for the purpose of visiting and inspecting the gas-meter and gas-governor works of Messrs. Peebles & Co., Ltd. Arriving in Edinburgh, they proceeded to Bonnington—midway between Edinburgh and Leith—where the works of the firm are situated. Col. Peebles met the visitors.

An interesting inspection was made of the many articles manufactured in the way of ordinary and prepayment gas meters and governors of all kinds. Models, drawings, and patterns were shown and explained. Particular interest was manifested in the moulding shop, where fine castings with intricate cores were in process of making. In the brass shop, valves for station, district, and consumers' governors were shown, either completed or in parts, and the fine workmanship required was a matter of much comment.

Meter parts were seen being stamped-out and pressed-up, and the several stages of meter making were described by men in actual operation on the different parts. The firm's seamless telescopic diaphragm, specially constructed to deal with present-day gas, was of great interest, as was also their simple front change-plate attachment, which, along with the valve, is fixed entirely outside the meter. The testing of meters or soundness and accuracy of registration, and the actual testing of all kinds of governors for high and low pressure supplies and for dealing with both volume and pressure, was shown. The firm's underground district governor, with air-pressure control from a pillar-box, was much commented upon for its accessibility and simple arrangement and extreme flexibility. It was clearly demonstrated, as a result of tests, that the ideal condition for gas supply is a constant pressure.

The firm was established in the year 1866, by the late Mr. D. Bruce Peebles, F.R.S.E., F.R.S.S.A., at the Fountainbridge Works, Edinburgh, where gas-meters and gas-governors of all kinds were manufactured. The business developed so rapidly that extensions soon became necessary, and in the short period of ten years all available space had been utilized, so that complete new works were required and constructed in 1876. At the new works many patents and improvements were brought out, among which may be mentioned the world-famed Peebles needle governor burner for domestic and public lighting, also a new and improved form of station gas-governor and a simplified dry meter. The familar consumers' governor to control the pressure of supply to the whole or a number of lights in a building, placed either at the gas-meter or on sections of the service-pipes, then claimed attention; and the Peebles patent diaphragm governor was placed on the market, and quickly gained favour, to be followed shortly after by the patent double-cased mercurial governor. With the introduction of the incandescent light, the firm brought out fresh apparatus for controlling the supply to the nipple of the burner, both by means of pressure and volumetric governors; and to-day these governors are universally adopted in this sphere of gas lighting.

The manufactures of the firm in other lines—namely, gas-meters and gas-works governors—have kept well abreast of the times. In large governors for gas-works and distribution mains, the "Peebles" safety enclosed station governor and underground pressure governors have a wide reputation. All sizes are manufactured, and there are many different types from which to choose. Governors for the retort-house hydraulic main are also manufactured in large numbers. These are all of the enclosed type (in fact, this is an important feature of all governors manufactured by this firm), so that accidents are impossible, and dust and dirt are entirely excluded. For controlling the pressure of gas in underground mains, Messrs. Peebles & Co. have governors of two special types—one with a water seal and the other sealed by mercury. An important feature for use with underground governors, especially where the governor is placed under the roadway, is their patented system of air loading from a distance. There seems to be no end to the varieties of governors required for modern gas supply, and Messrs. Peebles & Co. have types for every purpose for upward and downward or horizontal flow of gas, and from the smallest size to control the supply to the by-pass of a burner to the largest station governor required, and not only so, but capable of dealing with ranges of pressure from a few tenths of an inch of water gauge to the highest pressures now used in pounds to the square inch.

In the course of the day, the juniors made the best use of the opportunities put in their way for assimilating knowledge; leaders conducting them from one department to another, and explaining in detail the construction of the different apparatus. Two hours were spent in the inspection, and thereafter motor buses were in readiness to convey the party to Edinburgh. A halt was called at Messrs. Ferguson and Forrester's Restaurant in Princes Street, where tea was provided. Col. Peebles, the head of the firm, occupied the chair, and was at pains to ensure that from first to last all the visitors spent an enjoyable as well as an informative day.

AN AID TO THE CALCULATION OF MEAN SPHERICAL AND MEAN HEMISPHERICAL CANDLE POWERS.

By A. RENFRED MYHILL, A.I.C.

Before describing the method used, it will be useful to refresh the memory with a consideration of the principle involved in calculating the mean spherical or hemispherical candle power of a light-source. Such a value is not, of course, that given by taking a direct average of the various candle-power observations at angular intervals (except in the case of a perfectly circular or semicircular polar curve with the light-source at its centre), but it takes into consideration also the extent of the zone which is illuminated between such angular intervals.

Suppose that candle-power determinations are taken around the source of light at angles of 0°, 10°, 20° . . . 90° to the horizontal. For purposes of calculation, it is assumed that the illumination on the belts or zones of the surface of the hemisphere which subtend such angles is uniform. Consider a mean hemispherical (lower) determination. For a horizontal observation, an even illumination of $\frac{C_0}{R^2}$ is produced over a zone bounded by the equator and latitude 5° South, to use a geographical form of nomenclature. (If a mean *spherical* determination is being made, this illumination is assumed over a belt bounded by latitudes 5° North and 5° South). For an observation at 10° below the horizontal, the zone is from 5° South to 15° South, and so on; Cx representing the observed candle power at angle x° from the horizontal, and R the radius of any sphere with the light-source as centre. The zones at the vertical positions differ from all the others, in so far as they are not rings, but small circular portions around the poles. It will be evident, therefore, that the nearer the zone is to the equator, the greater will be its area—with the single exception of the 0° zone in the case of hemispherical determinations, which, of course, is only half a complete zone, the other half not entering into the calculation.

The light flux falling on any zone subtending an angle x° is equal to $\frac{Cx\ Ax}{R^2}$, where Ax is the area of that portion of the surface of the sphere which comprises the zone. If the total area of the surface of the sphere is represented by A, and the mean spherical candle power by C, the total light flux over the whole area will be $\frac{C\ A}{R^2}$.

But, $\frac{C\ A}{R^2} = \frac{Cx\ Ax}{R^2} + \frac{Cy\ Ay}{R^2} + \frac{Cz\ Az}{R^2}$ + &c., where Cx, Cy, Cz, &c., are the observed candle powers at angles x°, y°, z°, &c., and Ax, Ay, Az, &c., are the corresponding areas of the subtending zones, the sum of which equals the total area of the surface of the sphere. R is the radius of the sphere.

Considering A as unity, and multiplying throughout by R^2,

$$C = Cx\left(\frac{Ax}{A}\right) + Cy\left(\frac{Ay}{A}\right) + Cz\left(\frac{Az}{A}\right) + \&c.$$

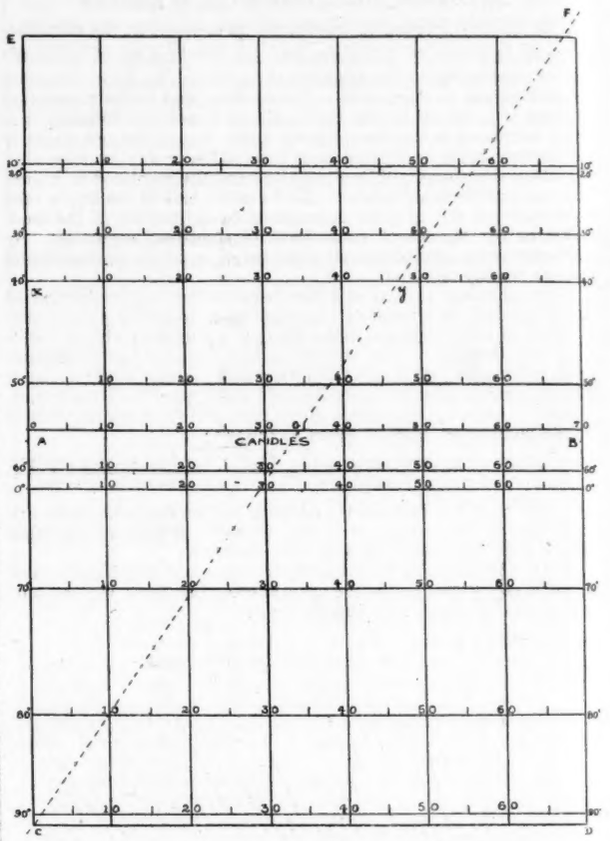
—*i.e.*, the mean spherical candle power is equal to the summation of the various observed candle powers taken over the whole angular range, multiplied respectively by the ratio which the area of the subtending zone bears to that of the whole sphere. The sum of the whole of the quantities $\frac{Ax}{A} + \frac{Ay}{A} + \frac{Az}{A}$ + &c., is equal to unity.

Similarly, the mean hemispherical candle power is obtained by adding together the various observed candle powers, multiplied by their respective factors; the latter being twice the values for the same angle as in the case of mean spherical determinations, since the area of the surface of a hemisphere, and not of a sphere, is taken as unity. As previously explained, however, the factor for the horizontal position remains the same as in the case of mean spherical determinations.

The factors representing the areas of the zones subtended at different angles are given below; the area of the *hemisphere* in this case being taken as unity. For convenience of reference, the symbol ϕ_x is given to indicate the factor for an observation at any angle x°.

Angle to Horizontal.	Range of Angle.	Ratio (Area of Zone ÷ Area of Hemisphere) = ϕ_x
0°	0°– 5°	0·085
10°	5°–15°	0·168
20°	15°–25°	0·166
30°	25°–35°	0·150
40°	35°–45°	0·138
50°	45°–55°	0·112
60°	55°–65°	0·090
70°	65°–75°	0·060
80°	75°–85°	0·028
90°	85°–95°	0·003
		1·000

From the above table, it is an easy matter to calculate mean spherical or hemispherical candle powers; and such is the usual practice, where the Rousseau curve or other graphical method is not employed. The simple scale which has been constructed by the writer, however, and which is described below, and illustrated in the sketch, greatly shortens the time taken in working-out the result from a set of observations.



Referring to the diagram, A B is a horizontal line, which is drawn roughly mid-way between the top and bottom of a sheet of paper, which latter, for convenience of marking-out, may be divided into squares of (say) $\frac{1}{10}$ in. side. Along A B, divisions are marked-off representing candle powers to a definite scale of length. The scale should be such that the total distance from A to B represents somewhat more than the candle power of the light source. A line C D is now drawn below A B, and parallel to it. Its distance from A B may be any amount; but, for convenience, it should be fairly near to the bottom edge of the paper, and should be on such a scale as to be readily divisible into (say) 50 or 100 suitable units.

The distance A C (or B D) is to be considered as equal to 0·10 of a hypothetical unit of any predetermined magnitude. From C, mark upwards, along C E, certain positions, shown in the sketch as 10°, 20°, 30°, &c.; the distances between C and these several points being representative of the values of ϕ_x on the scale A C = 0·10, where x° is the angle so marked on the diagram. For example, the distance from C to the 80° mark is 0·28 × A C; that from C to the 0° mark being 0·85 × A C, and so on. Lines are now drawn through these points, parallel to C D; and such lines are divided-up as in the case of A B, and on the same scale, into divisions representing candle powers.

The whole diagram is mounted on a stiff board; and a radial arm, pivoted about the point C, is constructed of celluloid or other transparent material, of such a form that a straight line CF, drawn on its underside, is capable of rotating about C as shown by the dotted line. The apparatus is now complete, and ready for use within the range of the candle powers under consideration. Other similar scales may be constructed, if required, for other ranges.

The principles involved in its use are simple. Consider any point G on AB. The distance AG bears the same relation to xy as CA bears to Cx, where x is the zero point and y the point of intersection of any horizontal line with CF. As an example, xy is shown on the 40° line, although, of course, any other horizontal line, either above or below AB, would illustrate the point equally well.

If, therefore, the radiant arm is rotated about C, so that CF passes through the point on AB representing the candle power at any angle, it is only necessary to note the position of its point of intersection on the horizontal line marked with the number of degrees of the particular angle, to obtain a value which is 10 times the value of (ϕ × candle power), since CA = 0·10. The sum of all such components, therefore, divided by 10, is equal to the mean hemispherical candle power.

To make this clear by a concrete example:

Angle.	Candle-Power.	Point of Intersection of Radial Arm With Angle-Line.
0°	34·3	29·1
10°	34·0	56·5
20°	34·3	56·5
30°	34·0	51·0
40°	34·0	47·0
50°	33·8	37·5
60°	34·3	31·0
70°	33·6	20·0
80°	34·9	10·0
90°	34·3	1·0
	Total = 10 × M.H.S.C.P. =	339·6

$\therefore$ M.H.S.C.P. = 33·96

In the case of mean spherical candle powers, the same table and scale may be used; but, since the factors for ϕ_z are half the values used previously, the total of all the components as found on the scale constructed for mean hemispherical values is twenty times the M.S.C.P.

There will be, of course, two angles each of 0°, 10°, 20°, 30° . . . 90°, one for the upper and one for the lower hemisphere. As an example:

	Angle.	Candle Power.	Point of Intersection of Radial Arm with Angle Line.
Upper hemisphere	90°	34·3	1·0
	80°	30·0	8·4
	70°	30·0	18·0
	60°	28·5	25·5
	50°	30·6	34·0
	40°	34·0	42·0
	30°	35·0	47·0
	20°	35·2	58·0
	10°	34·0	56·5
Horizontal	0°	34·3	58·2 (actually 29·1 × 2).
Lower hemisphere	10°	34·0	56·5
	20°	34·3	56·5
	30°	34·0	51·0
	40°	34·0	47·0
	50°	33·8	37·5
	60°	34·3	31·0
	70°	33·6	20·0
	80°	34·9	10·0
	90°	34·3	1·0
	Total = 20 × M.S.C.P.		659·1

$\therefore$ Mean spherical c.p. $= \frac{659 \cdot 1}{20} = 32 \cdot 96$

The writer has not come across any other method of calculating mean values which is so rapid as the above. The slide-rule is, of course, not of much assistance, unless a series of determinations for many light-sources is being made. The integrating type of photometer, while giving at once mean spherical values, furnishes no information as to the distribution of the light.

THE ROMANCE OF THE GAS INDUSTRY.*

FIRST thoughts about this title are perhaps prone to bring a smile to the lips even of some of us who are in daily touch with the manufacture and distribution of gas; and the reviewer's new "novel" has certainly caused a modicum of merriment among his companions, who are of the "general public," vacillating between hard facts and the inspired leadership of the Daily Press. Second thoughts, however, are that there is romance in anything which it is worth while doing; and it is doubtless the romance of the gas industry which largely forms the fascination that leads so many brilliant men to embark on the task of public service—the industry's true motto.

Romance there certainly is in our industry, when we think that its seed was sown many thousands of years ago by the engulfing and compressing by the earth's crust of the earliest vegetation. Ages passed, till about 300 B.C. coal was mentioned by a Greek philosopher; and in 852 A.D. a reference was made to it in England. In 1250 it became a commercial commodity; and its use in London was in 1316 forbidden by royal proclamation on account of the "noisome smell." Then came the studies of the old alchemists; and in 1609 van Helmont, of Brussels, discovered "gas," for a heated crucible "did belch forth a wild spirit or breath."

This entertaining book takes the reader rapidly through the long ages, describing the steps which have led to the great gas industry of to-day, and explaining in colloquial style the methods of recovering and distributing the "soul of coal," which has also been named "bottled sunshine." Even the lay reader would see romance in gas if he read the book and followed through the fifty odd excellent illustrations; and his interest in the recovery of a high percentage of the stored-up heat, of the potentialities of gas in peace and in war, and its capacity to serve an enormous public, would grow with his knowledge.

Under the chapter heading "*Semper Fidelis*," the author says: "This story has set forth briefly the beginnings and progress of an industry which has the unique distinction of being old yet ever new. It is old when the years of its service are compared with those of other public utilities, and new when the field of its ever-growing influence, usefulness, and performance is fully considered."

The 156 pages of text are followed by interesting and useful appendices, of which the first is a complete chronology of the industry's development, and the second shows the dates on which gas lighting was introduced in the world's principal cities. In the third appendix we find a list of the industry's Journals and Associations, and regarding the former are proud to find no earlier reference than "Gas Journal (London), Feb. 1, 1849." Among the reference books enumerated in Appendix D, two—"Measurements for the Household" and "Standards for Gas Service," publications of the U.S. Standards Bureau—are annotated and emphasized as of special service to the public; an excellent idea.

The author is to be congratulated on his compilation, and the publishers on putting before the public a light book of great interest and utility.

* By Oscar E. Norman. Chicago: Messrs. A. C. McClurg & Co. Price $1·50.

A NEW GASHOLDER AT BURNHAM-ON-SEA.

A representative gathering of West Country Gas Engineers assembled at Burnham (Somerset) on Tuesday of last week, by invitation of the Chairman and Directors of the Burnham Gas Company, to inspect a new gasholder recently erected by Messrs. S. Cutler & Sons, Ltd. The gas affairs of this popular seaside resort are in capable and progressive hands; but war-time restrictions and the succeeding years of high prices had delayed the provision of additional storage to very near the danger point, and it became imperative to secure increased gasholder capacity before the peak load of the winter months arrived.

The gasholder is in two lifts, and is prepared for future extension to three lifts. The tank is of steel, and entirely overground; and the guide-framing is of the well-known Cutler triangulated design. The inner lift is heavily built to provide a minimum pressure of 5½ in.—a feature which has brought immediate benefit to the outlying districts supplied by the Company. The entire storage has hitherto been only 50,000 c.ft., but by the provision of this new holder is now increased to 225,000 c.ft., while a further 90,000 c.ft. will be available when the third lift is added. The handsome design and excellent workmanship of the gasholder were the subject of much favourable comment on the part of the visitors; and the fact of its being completed and put into service in time for the Company's winter requirements, notwithstanding the considerable delays caused by the engineers' lock-out, reflects credit upon the energy and resources of the Contractors, and the Company's capable Manager, Mr. Alfred Thomas.

The visitors included Mr. J. E. Norman (Chairman of the Weston-super-Mare Gas Company), Mr. Alfred Burnett (Chairman of the Highbridge Gas Company), and the following Gas Engineers and Managers: Messrs. J. Taylor (Weston), J. H. Cornish (Bridgwater), Phillip Thomas (Wellington), C. Harris (Taunton), D. Garlick (Glastonbury), and A. E. Tulk (Highbridge).

At the luncheon which followed the inspection, the Chairman of the Burnham Gas Company, Mr. W. H. May (who was presented with a silver salver) complimented the Contractors upon the thorough and expeditious way in which the work had been carried out. Mr. S. Cutler, jun., suitably replied, and mentioned that all materials used were of British manufacture, and the construction, delivery, and erection of the entire structure had been completed within five months. In proposing the "Visitors," Mr. J. H. Palmer (a Director of the Burnham Gas Company) gave an interesting review of the history of the Company, which under the present management has become a very prosperous and progressive concern.

Uses of Gas in America.—An analysis of all the available figures indicates that the manufactured gas output of the United States is now used for various purposes in the following proportions: Illumination, 21 p.ct.; domestic uses other than illumination, 54 p.ct.; industrial and unclassified, 25 p.ct. Some twelve years ago, a similar compilation showed that the gas manufactured and sold in 1910 was distributed in these proportions: Illumination, 45 p.ct.; domestic uses other than illumination, 50 p.ct.; industrial and unclassified, 5 p.ct.

Gas from Refuse Straw.—The United States Department of Agriculture have built a number of experimental gas plants in rural neighbourhoods, to determine the practicability of using straw and other farm bye-products as substitutes for coal in the manufacture of gas. It has been found that a ton of sun-dried wheat straw will make 10,000 c.ft. of gas, 600 lbs. of carbon residuum, and some 10 gallons of tarry liquid. The United States produce annually about 126 million tons of straw from wheat, oats, barley, rye, rice, &c., and 207 million tons of corn fodder. Of these totals, about 39 million tons are burned each year. This straw and fodder, if made into gas (using it both for gas extraction and for fuel) would, it is calculated, produce some 273 million c.ft. of gas of excellent quality. In addition to the straw and fodder, corn cobs, cane trash, palmetto, and other material can be used to make gas in those parts of the country where they are produced, and where coal is difficult or expensive to obtain.

THE THERMAL EFFICIENCIES OF PRODUCTION OF DIFFERENT GRADES OF GAS.

By Dr. A. PARKER, F.I.C.

Research Chemist to the Joint Committee of the University of Leeds and the Institution of Gas Engineers.

[A Paper submitted at the Fuel Symposium of the Society of Chemical Industry.]

The industrial position attained by this nation is undoubtedly due in large measure to the possession of a good supply of coal. Many different estimates have been made regarding the length of time this supply is likely to be available at the present rate of consumption; but even with the most generous estimate, the nation cannot afford to utilize this important asset except in the most economical manner, and at the same time determined efforts must be made to eliminate the smoke nuisance. That there is ample room for improvement in the existing methods of utilization of coal is at once evident from the following considerations.

1.—The ordinary domestic fire is so inefficient that only a small proportion, approximately 25 p.ct., of the potential heat value of the coal used is radiated into the room.

2.*—At present, the electricity generating stations of the United Kingdom, including electric railways, deliver 7·6 p.ct. of the heat of combustion to the consumer. The boiler loss, turbine loss, thermodynamic conversion of heat into work, and transmission loss account for over 92·0 p.ct. of the total heat produced by combustion in the central boiler furnaces.

3.—The gas-works of the United Kingdom carbonize about 20 million tons of coal per annum, producing town gas, coke, tar, and other bye-products, with a thermal efficiency of from 70 to 80 p.ct. If the whole of the heat expended on the carbonization of coal be debited to the coal gas which is produced, then of every 100 units of heat so expended at the gas-works, 45 are available for the use of the consumer, and 55 are lost in the process of gas making and distribution.

Since the foundation of the gas industry, at the beginning of the last century, efforts have continuously been made to obtain the highest possible efficiency and economy in the production of gas and its bye-products. Improvements have been made largely as the result of long practical experience; but the gas industry now appreciates that, though experience and empirical trials may lead to improvements and conclusions as may carefully planned scientific investigations, a combination of the two methods produces results more quickly and with fewer failures.

For some years there has been definite co-operation in research between the gas industry and the Department of Coal Gas and Fuel Industries of the University of Leeds. The research work is under the control of a Joint Committee, consisting of an equal number of representatives of the University of Leeds and the Institution of Gas Engineers. Prof. Smithells is the Chairman of the Committee, and the Hon. Secretary is Prof. Cobb, who is also responsible for the supervision of the work. During the last few years the investigations have been divided into two main groups. The one dealing with the efficiencies of utilization of different grades of gas is in the immediate charge of Mr. J. W. Wood, M.Sc. The writer is in immediate charge of the second group of investigations—into the efficiencies, from thermal and chemical standpoints, of processes for manufacturing gas. It is proposed, therefore, to give a general review of the work already completed in this second group.

* "Report on the Coal Gas and Electrical Supply Industries of the United Kingdom," by Sir Dugald Clerk, Prof. A. Smithells, C.M.G., and Prof. J. W. Cobb, C.B.E. (Institution of Gas Engineers, April, 1919).

STEAMING IN CONTINUOUS VERTICAL GAS-RETORTS.

(Fourth Report of the Research Committee of the University of Leeds and the Institution of Gas Engineers.)

The necessity for strict economy in coal during the war stimulated developments in carbonization mainly in the direction of complete gasification—*i.e.*, conversion of the "fixed carbon" of the coal into gas. Those gas undertakings which were in the fortunate position at the outbreak of war of possessing continuous vertical retorts were able to attempt the greater gasification of coal by the continuous introduction of steam into the retorts. Many of the results thus obtained were published; but the general incompleteness of the figures, as brought out in attempts to construct carbonization balance-sheets, led the Joint Research Committee to take advantage of the offer of the Bothwell and Uddingston Gas Company to place their installation at the disposal of the Committee for the purpose of carrying out complete tests. The inquiry into the thermal and chemical efficiencies of manufacture of different grades of gas was commenced in January, 1919, by an investigation of the process of steaming the charges in continuous vertical gas-retorts.

The installation at Uddingston is of the Glover-West system, designed for making gas of about 550 B.Th.U. gross per c.ft. The coal is fed into the retorts by gravity from small hoppers at the top, which have a capacity sufficient for several hours' supply. It is usual to recharge these from the main coal bunker through close-fitting valves every hour. The rate at which coal falls by gravity into the retorts is regulated by the rate at which coke is mechanically extracted at the bottom. The coke extractors are operated by one central driving system, the speed of which can be accurately controlled. In addition, the speed of the extractor for each retort can be adjusted separately. After dropping from the extractor, the coke passes into a chamber with a self-sealing lid, from which the coke is drawn every two hours. During the steaming tests, the steam was admitted into each retort through a nozzle placed in the side of the coke chamber just below the extractor.

Each setting contains eight retorts, arranged in two rows of four. The eight retorts are heated by means of one producer. The heating chambers round the retorts are arranged in ten horizontal tiers. The two at the bottom are used for the purpose of pre-heating the secondary air supply. Combustion of the producer gas takes place in the next five horizontal chambers, while in the three top chambers the products are circulated round the retorts before passing away to the chimney.

During the tests carried out on this installation, all measuring devices—such as weighing machines, gas-meters, tar and liquor tanks, calorimeters, and other apparatus—were carefully calibrated. Special attention was also given to the sampling of the coal used and the products, and sufficient analyses and temperature measurements, &c., were made to enable the construction of thermal and chemical (carbon, nitrogen, and sulphur) balances.

The results of the Uddingston tests proved that, with proper control of the conditions—such as throughput of coal, temperatures of the setting, rate of admission of steam, &c.—advantages are to be gained by moderate steaming. Seven tests in all were reported, the amount of steam being gradually increased until the last test aimed at complete gasification. The more simple thermal balances for the first five tests are given in the following table.

The thermal balances show that the efficiency of gas production rose from 54·4 p ct. in the first test without steam to 62·1 p.ct. in the fourth test. Comparing the yields in the first and fourth tests, it was found that the make of gas per ton of dry coal increased from 10,384 c.ft. of 544 B.Th.U. gross to 19,902 c.ft. of 436 B.Th.U. gross. Further, the thermal value of the gas made per retort per day rose from 159·4 to 267 therms gross (one therm = 100,000 B.Th.U.). At the same time, as against an ammonia yield equivalent to 36·3 lbs. of pure ammonium sulphate in the first test, 42·4 lbs. were obtained in the fourth test; and the amounts of dry tar were respectively 14·6 and 22·8 gallons. These increased

TABLE I.—*Heat Balances Per Cent.*

Coal used, Lanarkshire Washed Nuts. Heat of Combustion of Coal = 100.

Test No.	1.		2.		3.		4.		5.	
Heat supplied—										
1.—Coal		100·00		100·00		100·00		100·00		100·00
Heat value of products—										
2.—Coke		65·72		61·62		58·38		55·20		52·32
3.—Tar		9·26		11·20		11·28		13·76		14·45
4.—Gas		20·04		23·69		26·52		30·01		31·20
		95·02		96·51		96·18		98·97		97·97
6.—Less fuel for setting	11·84		11·65		12·27		12 76		13·82	
7.—Less fuel for steam to retorts	*nil*	11·84	1·87	13·52	3·12	15·39	4·53	17·29	6·23	20·05
8.—Heat content of products available for sale		83·18		82 99		80·79		81·68		77·92
9.—Heat used and lost in manufacture		16·82		17·01		19·21		18·32		22·08
		100 00		100·00		100·00		100·00		100·00
Efficiency of gas production p.ct. $= \frac{\text{item 4} \times 100}{\text{item 4} + \text{item 9}}$		54·37		58·21		57·99		62·09		58·56
Efficiency of carbonization p.ct. = item 8		83·18		82·99		80·79		81 68		77·92

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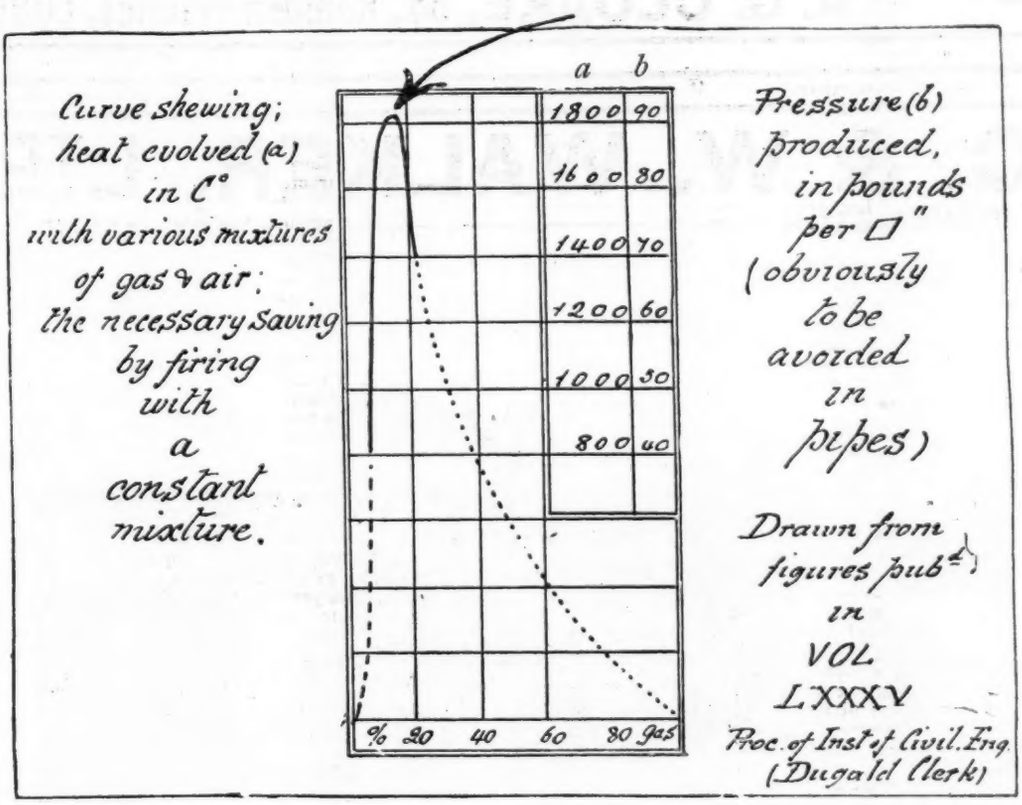
Curve shewing; heat evolved (a) in C° with various mixtures of gas & air: the necessary saving by firing with a constant mixture.
a b
1800 90
1600 80
1400 70
1200 60
1000 50
800 40
% 20 40 60 80 gas
Pressure (b) produced, in pounds per □" (obviously to be avoided in pipes)
Drawn from figures pub'd in VOL LXXXV Proc. of Inst. of Civil Eng. (Dugald Clerk)

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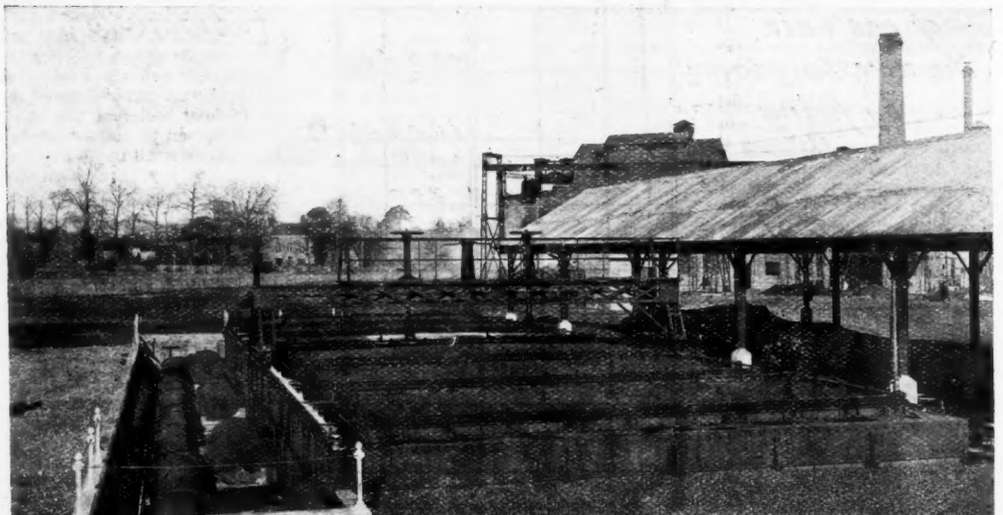

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yields were obtained with a reduction of less than 3 cwt. in the amount of dry coke available, after making due allowance for the extra fuel required in the fourth test for raising steam and heating the retorts.

The efficiencies obtained could undoubtedly be increased by the utilization of much of the heat carried away by the waste gases. Waste-heat boilers are now in operation in several continuous vertical retort installations; and it is believed that they are proving themselves well worth the extra capital involved. Steaming to a greater degree than that adopted in the fourth test caused a reduction in thermal efficiency. The seventh test proved that, though complete gasification by steaming in continuous vertical retorts can be obtained, the process is not a commercial proposition with existing plant. The results generally were afterwards confirmed by the work on this subject carried out at the Research Station of the Fuel Research Board, and described in a paper to the Institution of Gas Engineers by Sir George Beilby in 1921.

The Manufacture of Blue Water Gas.

(Sixth Report of the Research Committee of the University of Leeds and the Institution of Gas Engineers.)

The next logical step in the investigation was to examine the process of manufacture of blue water gas as ordinarily carried out in a separate generator, in order that a comparison might be made with the method of steaming in continuous vertical retorts. This was rendered possible by the generosity of the Birmingham Gas Department in offering the Humphreys and Glasgow installation at their Adderley Street works.

Generally speaking, a blue water-gas generator consists of a cylindrical steel chamber lined with firebrick, and provided with a gas-tight charging device at the top and with suitable arrangements for the admission of air and steam and for the exit of blast products and water gas. The process of manufacture is intermittent. Air is blown through a hot bed of coke in the generator until the fuel is raised to incandescence; the blast products being carried away up the stack to the atmosphere. The air supply is then shut-off, the stack valve closed, and steam is passed through the heated fuel. The resultant blue water gas is made to pass through a scrubber system before further purification either before or after mixing with coal gas. When the desired amount of steam has been passed through, the steam supply is cut-off and the temperature of the bed of fuel is again raised by another period of air-blowing. The air-blow and steaming operations are thus alternated.

According to the usual routine of operation at the time of the tests described in the Sixth Report of the Research Committee, clinker and ashes were removed from the generator every six hours. The generator was charged with coke to a depth of 8 ft. every 41 minutes; and the usual cycle consisted of a one-minute blow followed by a four-minute run, divided into one-minute steaming in an upward direction, two-and-a-half minutes downward steaming, and half a minute up. During the last forty-minute period before clinkering, steaming was operated in an upward direction only. The purpose of the last series of all up runs was to cool the lower part of the fuel bed prior to the removal of ashes and clinker.

The average composition of the blast products and water gas produced during the several tests carried out at the Adderley Street works by the Research Committee of the University of Leeds and the Institution of Gas Engineers are given in the following table.

Table II.—*Composition of Gases, Volume Per Cent.*

—	Blast Products.	Blue Water Gas.
CO_2	12·2	4·25
C_mH_n	0·0	0·05
O_2	0·2	0·10
CO	12·8	41·40
H_2	3·0	49·15
CH_4	0·5	0·75
N_2	71·3	4·30

The average gross calorific value of the blue water gas made was 301 B.Th.U. per c.ft.; and for the production of 1000 c.ft. of this gas, it was necessary to supply to the generator 43·7 lbs. of dry coke, which contained 13·1 p.ct. of ash. Full thermal and chemical balances were constructed from the results obtained during the tests. The figures obtained in the thermal balances have been averaged; and the results thus derived are arranged in the following table, in which the various items represent heat values in therms per 1000 c.ft. of blue water gas made.

Throughout the figures in this table the calorific values are those at ordinary temperature (15·5° C.), and the items for the amounts of sensible heat represent the differences of the heat contents at ordinary temperature and the temperature of the substance under consideration. The thermal efficiencies of gas production have been calculated according to the principle defined in the Clerk-Smithells-Cobb report to the Institution of Gas Engineers in 1919—*i.e.*, the thermal efficiency is given by the heat in the gas multiplied by 100 and divided by the sum of the heat in the gas and the heat used and lost in manufacture. Following this definition, the figure 46·3 is given by item (1) multiplied by 100 and divided by 6·505; and the figure 55·8 is obtained by multiplying item (1) by 100, and dividing by the sum of items (*a*) and (*b*).

Table III.—*Heat Balance in Therms per 1000 C.Ft. Blue Water Gas Made.*

One Therm = 100,000 B.Th.U.

Heat supplied—	
(*a*) Coke to generator	5·387
(*b*) Fuel to raise steam to generator	0·535
(*c*) ,, ,, ,, turbo-blower	0·578
(*d*) Sensible heat of air to blower	0·005
	6·505
Accounted for as follows—	
(1) Blue water gas, potential heat	3·010
(2) ,, ,, ,, sensible heat	0·118
(3) Steam not decomposed (total heat)	0·134
(4) Blast products, potential heat	1·303
(5) ,, ,, sensible heat	0·306
(6) Heat lost in raising steam to generator	0·160
(7) ,, ,, ,, ,, to turbo-blower	0·173
(8) Heat of steam used and lost in turbine	0·400
(9) Ashes, clinker and dust, potential heat	0·400
(10) ,, ,, ,, sensible heat	0·024
(11) Losses not separately determined, leakages, radiation, convection, &c. (difference)	0·477
	6·505
Efficiency of gas production p.ct. :	
Fuel for steam for generator and turbine taken into account	46·3
Fuel for steam for generator and turbine not taken into account	55·8

The heat balance indicates where the heat losses occurred in the blue water gas tests, and consequently where possible economies might be effected. The greatest individual loss is represented by the potential heat of the blast gases, which accounts for approximately 20 p.ct. of the total heat supplied. The average amount of heat lost as sensible heat in the water gas, blast products, and undecomposed steam—items (2), (3), and (5)—was approximately 8·6 p.ct. of the heat supplied. The heat losses represented by items (2), (3), (4), and (5) might be reduced considerably by the installation of a waste-heat boiler. From calculations which have been made (on certain assumptions) of the heat available for use in a waste-heat boiler, it has been concluded that sufficient steam could be raised to supply the generator and turbo-blower, in which case the over-all thermal efficiency would be increased from 46·3 to 55·8 p.ct. Alternative methods of diminishing the loss of heat due to the potential heat of the blast gases might be (*a*) to reduce the amount of carbon monoxide carried away up the stack, by changes in the method of operation of the plant, in so far as such changes could be made without prejudice to the efficient production of water gas during the run periods, or (*b*) to utilize the heat of the blast gases for carbonizing coal.

Carburetted Water Gas.

(Seventh Report of the Research Committee of the University of Leeds and the Institution of Gas Engineers.)

The third part of the investigation into the thermal and chemical efficiencies of manufacture of different grades of gas aimed at determining the efficiency of production of carburetted water gas in a plant with attached waste-heat boiler. This was made possible by the further generosity of the Birmingham Gas Department in allowing the use of the installation at their Windsor Street works. The waste-heat boilers of this installation were added in 1920. Attached waste-heat boilers are not usual with carburetted water-gas sets in this country. It is proposed therefore to give a brief description of one of the two sets used for the purpose of the investigation described in the Seventh Report of the Research Committee.

The plant is of the Humphreys and Glasgow pattern. The generator is connected by gas off-take pipes, both above and below the fuel bed, with the top of the carburettor. During the blow periods, the air enters the bottom of the generator, and the blast products travel through the outlet pipe at the top and thence, through the carburettor, superheater, and waste-heat boiler, to the stack, which is controlled by a valve at the top. During the run periods, when the blast valve is closed, the steam enters either below or above the fuel bed, and the resultant blue water gas is carried away by the outlet pipe at the top or bottom of the generator, according to whether the steaming is being operated in an upward or downward direction. The blue gas is then enriched with oil in the carburettor, whence it passes through the superheater into the wash-box, and thence to the scrubbers, condensers, and purifiers. Neither the blue gas nor the enriched gas is allowed to pass through the waste-heat boiler.

The enriching oil is fed into the top of the carburettor through an adjustable spray-nozzle, which is protected by a firebrick cone. An air valve is also provided at the top of the carburettor for the admission of the requisite quantity of air during the blow periods to burn sufficient blow gas to heat-up the carburettor and superheater to the temperature desired for cracking the oil.

By means of control valves, air may be admitted to the bottom and top of the superheater as required during blow periods, for the purpose of burning further quantities of gas. Much of the carbon monoxide, &c., remaining in the blow gas, after a sufficient quantity has been burned by the admission of air to the carburettor and to the bottom of the superheater to heat-up the carburettor and superheater to the required temperature, may be burned by the admission of a further supply of air at the top of

the superheater. By this means potential heat which would otherwise be carried away up the stack by the blow gas may be converted into sensible heat and rendered serviceable for raising steam in the waste-heat boiler.

The gas produced during the blow periods passes from the top of the superheater through a brick-lined pipe into a brick-lined chamber at the top of the waste-heat boiler. It then travels downwards through steel tubes into a chamber at the bottom of the boiler, whence it enters the stack. The boiler is therefore of the fire-tube type—*i.e.*, the hot gas travels through the tubes, and the water is on the outside. The steel tubes, which are lapwelded, are supported by two end-plates. The boiler is set at an angle to aid the circulation of water, the level of which is kept well above the top plate supporting the steel tubes. Any sludge which collects may be blown-off periodically through the two blow-off cocks—the one situated at the bottom of the boiler, and the other at the bottom of the lower circulating pipe connecting the boiler with the steam drum. The necessary man-holes are provided, and the top is removable for the purpose of cleaning. The boiler is designed to raise steam up to a pressure of 100 lbs. per sq. in., and the fittings include the usual steam and water gauges and safety valve.

According to the routine of operation of the plant at the time of the tests described in the Seventh Report of the Research Committee, clinkering was carried out every four hours. The generator was charged with coke to a depth of 8 ft. 9 in. every thirty-one minutes; and the usual cycle consisted of two minutes air-blow followed by four minutes steaming in an upward direction.

Occasional cycles included two minutes air-blow, three minutes downward steaming, and one minute up-run, except during the one hour preceding clinkering, when steaming was operated in an upward direction only.

The average compositions of the gases produced during the tests were as follows:

TABLE IV.

Volumes per Cent.	Blue Water Gas.	Carburetted Water Gas.	Blow Gas Leaving Generators.	Waste Gas Leaving Waste-Heat Boilers.
CO_2	6·1	5·3	11·8	16·8
C_mH_n	0·0	5·9	0·0	0·0
O_2	0·1	0·3	0·1	0·8
CO	38·4	34·7	14·1	3·4
H_2	51·6	38·3	2·7	1·1
CH_4	0·5	10·0	0·2	0·4
N_2	3·3	5·5	71·1	77·5
	100·0	100·0	100·0	100·0

The average gross calorific value of the carburetted water gas made was 483 B.Th.U. per c.ft. The coke supplied to the generators contained 11·2 p.ct. ash (dry basis), and the amount (dry) required per 1000 c.ft. of carburetted water gas made averaged 35·66 lbs. The volume of blue water gas produced in the generators per 1000 c.ft. of carburetted gas was approximately 840 c.ft., so that the amount of dry coke supplied to the generators per 1000 c.ft. of blue water gas produced averaged 42·4 lbs. The average amount of enriching oil supplied to the carburettors per 1000 c.ft. of carburetted water gas—*i.e.*, per 840 c.ft. of blue water gas—was 1837 gallons. The quantity of water actually evaporated in the waste-heat boilers per 1000 c.ft. of carburetted water gas made was 63·85 lbs., which amount was sufficient to supply the steam required for the generators, turbo-blower, exhausters, boiler feed pump, and oil feed pump, under the particular conditions of the tests.

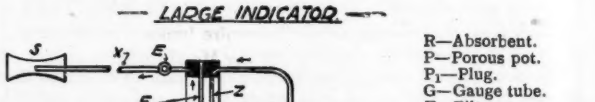
From thermal and chemical balances which were constructed, it was shown that the efficiency of production of blue water gas in the generators of the carburetted water-gas plant, without taking into account steam required or raised, was 53 p.ct. Taking into consideration the differences in the methods of operation, this figure of 53 p.ct. is in agreement with the corresponding figure of 55·8 p.ct. given in the Sixth Report.

The thermal efficiency of the whole process of manufacture of carburetted water gas of a calorific value of 483 B.Th.U. gross, taking into account the steam required for the generators and for driving the blower, exhausters, oil pump, and boiler feed pump, together with the steam raised in the waste-heat boilers, averaged 68 p.ct. It was calculated that if the steam required had been raised externally in boilers with 70 p.ct. efficiency, the efficiency of the whole process would have been only 59·5 p.ct.; so that the waste-heat boilers improved the over-all efficiency by 8·5 p.ct. The efficiency of production of oil gas during the cracking of the enriching oil was approximately 90 p.ct.; and it is this high efficiency which caused the efficiency of the whole process to be so high as 68 p.ct., though the blue water gas was produced in the generators with a corresponding efficiency of only 53 p.ct. It is clear, therefore, that in stating the efficiency of production of carburetted water gas with a particular enriching oil, it is necessary to state the quality of gas produced; for the over-all efficiency will be dependent on the amount of oil gas admixed with blue water gas.

In conclusion, it should be emphasized that this paper gives only a brief description of the work carried out on the subject by the Joint Research Committee. The detailed accounts in the three reports to which references have been made, together with the complete thermal and chemical balances contained therein, point definitely to the thermal losses accompanying the processes as at present practised and to the directions in which these losses might be reduced. The reports also include accounts of subsidiary investigations—such as methods of analysis, sampling, pyrometry, &c.—which had of necessity to be carried out before satisfactory progress could be made with the main investigations.

THE APPLICATION OF DIFFUSION TO GAS ANALYSIS.

Our attention has been drawn to a new method for the determination of any one constituent in a mixture of gases. Most recorders are costly; and the works chemist will be interested in an apparatus which gives a continuous record and is neither elaborate nor expensive.

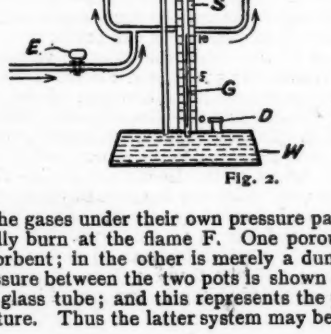


R—Absorbent.
P—Porous pot.
P_1—Plug.
G—Gauge tube.
F—Filter.
F_1—Detector tube funnel.
L—Lid.
E—Tap.
Z—Inlet detector tube.
B—Gas flow detector.
S—Aspirator.
X—Return pipe to fan race when induced draught is used.

Fig. 1.

It is of scientific interest to realize fully how an ordinary porous pot under suitable conditions can be adopted for automatic gas analysis. As a good example of this, assume it is required to know continuously the CO_2 content in a mixture of gases. If a porous pot P (fig. 1) mounted air-tight be filled with absorbent for CO_2 (say soda lime), and its open end closed by a lid L, then on aspirating the gases round the porous pot in the chamber it would be found a continuous vacuum is produced inside the pot; and the curious fact is that the amount of vacuum depends on the percentage of CO_2 surrounding the pot. Thus it becomes possible, by measuring with a water column this vacuum, to indicate on the gauge tube G the percentage of CO_2 passing into the chamber surrounding the porous pot. Such an apparatus is of value in the determination of the carbon dioxide content in flue gases; and the gas engineer and chemist is well aware of the importance of this in securing efficient boiler-control.

When the mixture of gases contains hydrogen as a constituent, the apparatus has to be modified. If the carbon dioxide content is then required, it becomes necessary to use two porous pots mounted as in fig. 2.



R—Absorbent cartridge.
R_1—Dummy cartridge.
P, P_1—Porous pots.
G—Gauge glass.
L, L_1—Lids.
E—Tap.
F—Lighted flame.
S—Scale.
W—Water tray.
D—Filling plug.

Fig. 2.

The gases under their own pressure pass round both pots and finally burn at the flame F. One porous pot only is filled with absorbent; in the other is merely a dummy. The difference in pressure between the two pots is shown by the head of water in the glass tube; and this represents the percentage of CO_2 in the mixture. Thus the latter system may be employed for indicating

the CO_2 content in water gas, and has been extensively adopted for this purpose.

The value of a chart is appreciated by all engineers. It enables them to trace accurately the underlying cause of a low carbon dioxide content in the flue gases, and imposes a check upon the working of the boiler firer. There is no indication in the diagrams that a recording mechanism can be fitted to these instruments, but full particulars may be had on application to Messrs. W.R. Patents, Ltd., Greek Street, Leeds.

It is advisable that an instrument working upon the above lines should be carefully calibrated under the particular working conditions it has to serve. If this precaution is taken, and an occasional check is made by an independent and reliable means, the apparatus, which has the virtue of simplicity, should serve a most useful purpose.

YORKSHIRE JUNIOR GAS ASSOCIATION.

The Presidential Address to the Yorkshire Junior Gas Association was delivered on Saturday, Jan. 27, by Mr. H. L. BATEMAN, at the headquarters of the Wakefield Gas Light Company, Vicarage Street, Wakefield, of whose undertaking he is Deputy Engineer and Manager.

By the courtesy of the Chairman and Directors of the Company, a gathering of over seventy members of the Association was not only accommodated for the purposes of the meeting, but was conducted in parties over the works by Mr. Bateman and his Assistant, Mr. Whitehead. The works visit covered the entire plant; the various operations in gas making being observed and commented upon with interest by the members.

Subsequently the meeting was held in the shareholders' large room at the offices—Mr. W. HEATHCOTE (Halifax), as Senior Vice-President, occupying the chair.

The CHAIRMAN said they had had an interesting visit to a plant of which the Company, and all concerned in its working, had every reason to be proud.

The PRESIDENT welcomed two new members in Messrs. Jackson (Sheffield) and Beinton (Scarborough).

Mr. BATEMAN expressed the apologies of Mr. H. Townsend, the Engineer and General Manager of the Wakefield Company, for being unable to attend that day, owing to ill-health.

The CHAIRMAN then called on Mr. Bateman, who gave the following

PRESIDENTIAL ADDRESS.

ECONOMIC FACTORS OF GAS PRODUCTION AND DISTRIBUTION.

In bringing this subject before you, it is recognized that an all-round efficiency policy is a necessity for the success of gas undertakings in carrying out their obligations, which are more stringent to-day than ever in the history of the gas industry. As each gas undertaking has its own peculiar conditions, depending to a large extent upon its size, situation, the delivered cost and classes of coals, the value of coke and other residuals, also the capital value and condition of existing plant for both manufacture and distribution, together with the amount of gas sold per meter and mile of main, it will be acknowledged to be a wide subject. However, many factors are not new to some of you, but are worthy of consideration in the light of the present-day method of selling gas on a thermal basis, and having regard to the urgent need for cheap therms.

Capital expenditure, based on the output of gas, should decrease as years go on, chiefly owing to increased business with existing plant. Additional capital will only go about one-third as far to-day as it did some years ago. Plant, however, requires renewal occasionally; and the fullest advantage should be taken of this. It is always advisable to assure oneself as to the possibilities of existing plant, before adopting a new type. Those forms of carbonizing plant which are designed to produce a gas having a calorific value of between 550 to 600 B.Th.U. with a temperature of about 1900° Fahr. in the retort, working under level gauge, are generally capable of producing economical results with low working costs per therm, and, in conjunction with a good blue water-gas plant and relief holder, will yield favourable results. It is well to remember that saving of labour is not always economy; but labour properly utilized is generally economical.

Having carbonization plant capable of producing a 600 B.Th.U. gas, and a blue water-gas plant for 300 B.Th.U. gas, we arrive at the question of the calorific value of the mixed gas. This matter has been the cause of much research work, thought, and writing; but one's recommendations are guided by experience, and it seems to be generally recognized that a 500 B.Th.U. gas is the most serviceable, after taking all the facts into consideration, except in exceptional circumstances. Gas of this quality is capable of giving efficient service with modern gas appliances, if supplied under correct conditions of pressure which enable the primary air to be mixed with the gas at the burner. Undertakings which produce the greatest number of therms per ton of coal carbonized do not always obtain the best all-round results and the cheapest gas per therm. With 500 B.Th.U. as a declared standard, we should obtain 75 therms per ton of coal in the form of gas for sale. The selling price depends mainly upon economic factors and the advantages taken of them—matters interlaced and needing careful thought.

The retort-house should be under constant supervision and kept in a first-class state of repair. After obtaining the most suitable coals, and with due care for carbonization temperatures—making certain that they are regular, and are kept just sufficiently high to carbonize the charge in a given period without overheating the settings and waste-gas flues—particular attention should be given to the collection of the gas. It should be borne in mind that overpulling does not produce the best results, but reacts most drastically upon the life of the retorts, the working conditions of the men, and finally ruins the possibility of obtaining good gas, and results in heavy maintenance costs. Attention given to the collection of gas by accurately adjusted retort-house governors and exhausters, is well repaid by an increased yield of residuals, which is an important factor in reducing the cost of production. Many of the improved results with the latest designs of plant are undoubtedly due to the choice of coals, constant supervision, attention to temperature of carbonization, and to the better methods of collecting gas from the retorts. There are many gas undertakings who are obtaining low costs per therm by careful attention to the details above-mentioned.

Condensation is also an interesting point; and much good can be done by carrying out this process efficiently. If full use is made of the light tars brought down from the gas in the condensers, the extraction of naphthalene can be almost complete. The author has carried out experiments on both water-tube and air condensers; and the results of tests over long periods prove that it is possible to obtain freedom from naphthalene troubles by the proper working of the condenser plant. It must be remembered that the smallest naphthalene content in gas is liable to produce increased distribution costs, which seriously react on the selling price of the therm, in addition to causing much inconvenience to the consumers.

Research work carried out on the life of gas-meters has shown the urgent necessity of extracting from the gas the last traces of various impurities; and constant attention to this matter reduces to a material extent the troubles with services and meters, and consequent maintenance costs. Dry purification by means of iron oxide is a process which can to-day be carried out at a small cost; but particular attention should be given to the material used for the purpose. By microscopical examination of various samples of new oxide, very interesting and useful observations can be made. Some kinds of material are in the form of small particles of which only the surface is usefully employed in the purification process; but classes of oxide material which are made up of very fine, moist particles of oxide well mixed with fibrous peat, produce excellent results, and can be worked-up to a saleable spent material. The material is helped considerably, and its market value enhanced, by extracting the tar-fog by means of suitable apparatus before the gas reaches the purifiers. It is advisable to have purifiers below ground level, in order to prevent the gas and purifying material becoming reduced to a low temperature during the winter.

With regard to the mixing of gases, it is advisable to employ a large relief holder and allow the correct proportion of water gas to meet the hot coal gas at the inlet of the condensers, controlled by a number of small valves. This arrangement ensures an even mixing of the gases, enables condensation to be carefully controlled, and the one set of exhausters will deal with the mixed gases, besides acting as a mixing-chamber. Another advantage of this arrangement is the even work thrown upon the purification system and the neutralization of the acid sulphur dioxide by means of the ammonia in the coal gas. The purification of water gas by itself presents difficulties, as the gas is of acid character, and very soon interferes with the proper working of the oxide, resulting in increased cost of production.

In the manufacture of water gas, the practice recently has been to work with high air-blast pressures in the generators. This no doubt increases in many cases the output per generator. The author is of the opinion that the advantages of an air-blast pressure of not more than 10 in., with a large grate area, are worth considering. It is possible efficiently to operate large water-gas plants, making nearly a million cubic feet of gas for periods of twenty hours, clinkering only once. This is a great advantage on a medium-sized works, and reduces the loss of fuel in the ashes to a material extent. It has been found that low blast pressures reduce the formation of large clinkers.

With regard to steam-raising, it is well-known that in many cases the use of waste-heat boilers is proving very useful and economical; but in several gas-works advantage cannot be taken of these, as the waste-heat gases leaving the main flues of the retort settings are at too low a temperature to be usefully employed; the regenerators extracting most of the heat. Where fired boilers are used for steam-raising, it is advisable to look carefully into costs and condition of boilers. There can generally be sufficient low-grade fuel reclaimed from the retort-house furnace ashes and small coke breeze to reduce considerably the cost of steam. Steam mains require careful attention in their arrangement, and need to be kept well-insulated. Also a careful watch on waste steam power will reduce costs. It is extremely useful to have a meter measuring the water used for steam-raising, and periodically to weigh the amount of fuel employed to manufacture a certain amount of gas, as by this means the approximate working cost of steam per million cubic feet can be calculated. These costs vary greatly at different periods and with different loads. The author read a paper before this Association describing how coke dust could be usefully employed for steam-

raising, and gave full details. This plant has proved to be in every way a sound proposition.

Distribution conditions have altered materially in many gas undertakings, and we now have keen competition to contend with if we are to retain our share of business. However good the quality and composition of the gas supplied may be, unless we maintain the output of therms the reaction will severely affect the selling price. Every effort should be made to obtain new business, and great care and attention should be given to present good consumers.

Heavy motor traffic is causing greatly increased costs of maintenance of mains and services; and it is very useful to keep graph diagrams showing the hourly output of gas to various districts. When a main is fractured, the graph shows the increased output due to loss of gas, and men can be dispatched to discover the broken main. In addition, the district mains can be divided into sections, and periodically tested for leakage by a meter. By constant supervision and by the use of leakage indicators, gas leakage can be kept at a reasonable figure. When the heat value lost by leakage is considered, it will be readily recognized as another phase of the "waste-heat problem."

In regard to low-grade gas *versus* high-grade gas, it has not been proved that low-grade gas can be manufactured at a cheaper rate per therm than a more concentrated gas. But there is no doubt that the former can be usefully applied for power and industrial heating processes, with the same measure of success as a high-grade gas, when actual combustion only is considered. In problems of this kind we must of necessity take all the economic facts into careful consideration, and take advantage of those which give the industry the best commercial results and the best all-round efficiency to our many classes of consumers.

DISCUSSION.

The Chairman (Mr. Heathcote) said the members had followed up a most interesting works visit by listening to an address bristling with ideas, and promising topics of discussion not merely for that afternoon, but for many future occasions. In past years it had not been customary to hold discussion on the presidential address. Last year, however, the President had himself expressed the hope that discussion would be in no way burked; and on this occasion he understood Mr. Bateman would welcome the opinions of the members on the points raised in his address.

Mr. C. T. B. Roper (Bradford) asked the President what type of leakage indicator was used in Wakefield, and with what degree of success. This was a factor in which all who were concerned in gas distribution were greatly interested.

Mr. Bateman said they used the ordinary type of indicator, with porous diaphragm—that form had been used for many years and had proved quite successful. The men went about the district, driving a small bar under the ground, and applying the indicator. Replying to a point made by Mr. Roper on the application of a bar over electric cables, Mr. Bateman said the Company had a good plan of the position of these, and the men took care not to operate over them. In the streets paved with setts they did not have to go very far down.

Mr. C. H. Chester (Southbank) said he gathered from the address that on the question of low-grade *versus* high-grade gas Mr. Bateman favoured the latter. He must differ with him in this. At his works they sent out a 400 B.Th.U. gas with very satisfactory results. He had tested the efficiencies of all classes of appliances, using all grades of gas from 300 to 550 B.Th.U.; and he found that with the 400 B.Th.U. gas he obtained as good results as with any. Finer adjustment was necessary with the 500 B.Th.U. gas; and in his opinion a better mixture was obtained at the burner with a 400 than with a 500 B.Th.U. gas. Therm for therm, he held that 400 B.Th.U. gas would give as good results as a 500 B.Th.U. gas. The economic production of the therm depended, of course, very much on local conditions, and in a large industrial area like that at Southbank it was found that it paid to make and issue a 400 B.Th.U. gas rather than a gas of higher grade. The inerts were 12 p.ct., and the therms per ton 76 to 80. In the matter of purification, one was really puzzled where to place orders for oxide—there were so many makes with good reputation. It was only after trying many samples, and carrying out tests according to the conditions of one's own plant, that one could decide upon this matter.

Mr. Bateman, replying to Mr. Chester, said he was inclined to agree that from the point of view of combustion, the low-grade gas could be used quite as satisfactorily as a gas of greater concentration. In reference to the make of 76 to 80 therms per ton of 400 B.Th.U. gas, he thought that if the manufacturing process were improved one could make the same amount of 500 B.Th.U. gas regularly by ordinary processes—with ordinary carbonization and water-gas plant. Opinions as to quality preferred differed in various districts, particularly in areas in which gas was used by large industrial concerns. In his experience of a 500 million works, having tried making various qualities of gas, they found, speaking generally, a happy medium in 500 B.Th.U., suiting all classes of consumers; and at Wakefield they were agreed on the general utility of such a gas. It had to be remembered, too, that the maintenance cost of meters was less if the gas were not below 500 B.Th.U. Looking back over various experiences, taking the average calorific value, and having in mind the opinion of the majority of gas engineers in Great Britain, he had come to the conclusion that it paid to keep the gas somewhere near 500 B.Th.U. He would not venture to predict what the future might hold. Referring to complete gasification, he had had experience of two such plants, and had carried out a good many tests; but he was not satisfied. He found that gas so made had an awkward habit of dropping its value after a few hours' storage.

Mr. A. Smalley (Castleford) reverting to Mr. Chester's remarks as to 400 B.Th.U. gas, asked whether any greater pressure was needed for the lower-grade gas, and whether, if greater pressure were applied, there was any difficulty in consumers' pipes. Speaking of the carcassing of new houses under housing schemes, Mr. Smalley said that while electricity authorities stipulated the quality of the materials to be used, the gas authorities made no attempt to control the materials which were to go to the service for consumers. He thought it was a serious obstacle to allow dwellings to be carcassed with ⅜ in. compo. pipe, as were houses which he had in mind.

Mr. Chester, answering the questions raised by Mr. Smalley, said at his works they worked at a pressure of 3 in. with their 400 B.Th.U. gas. He admitted they had had a certain amount of trouble owing to faulty carcassing, but no naphthalene troubles. In his own house was a ¾ in. supply and a ⅜ in. service, from which he had gas lighting, cooker, fires, and wash-boiler without any trouble. It was all ⅜ in. pipe carcassed; and he thought if this was sufficient for gas of 400 B.Th.U. it ought to be sufficient for 500 B.Th.U.

Mr. Smalley said they had not much naphthalene trouble at Castleford; but the opinion of one of their staff was that a 2½ in. pressure during the day was not sufficient at times, and had therefore concluded that the pipes were too small.

Mr. C. R. Ingham (Brighouse) asked if Mr. Bateman had any Lancashire boilers on the works under review. In reference to the water-gas plant, he would like to know whether there was any deposit of dust up to the relief holder and purifying plant.

Mr. Bateman said all steam was raised by the Babcock boilers from low-grade fuel. They had no Lancashire boilers—indeed, with their present system it was possible to take a much heavier load. Dust deposit had not been found in the main between the water-gas plant and the relief holder after about two years' working. The dust was practically entirely arrested in the wash-box, which was removed about once in six weeks, when a fine chocolate-coloured dust was found. On the plunger of the syphon pumps they found a small deposit of tarry matter; but it was not serious. The plungers required occasional cleaning. In the matter of purification, the usual method was followed, viz., the backward rotation system; the boxes were changed round each day. Peat ore was used, containing a percentage of iron oxide. Examined through the microscope, this material presented a very different appearance, and they could see small particles of oxide deposited on the ends of what looked like a twig. If the oxide used in lump form was examined, perhaps 80 p.ct. was useless, because, when crushed, it was found that the middle part had not been in contact with the gas. He advised viewing the oxide under the microscope before purchase. There was no trouble with the material in question in the way of overheating.

On the motion of Mr. J. M'Lusky (Calverley), seconded by Mr. H. S. Boyes (Harrogate), Mr. Bateman was awarded hearty thanks for his address.

Mr. Bateman, in responding, said he was glad the address had been thrown open to discussion. He felt that all meetings should be open to full discussion, in order that members could raise new points and side issues which could not possibly be covered by any paper or address on a subject. The more they discussed, the more they all learned. As to works efficiency, everybody must give of their best to get good results, and much depended on the men on the plant and their interest in their work.

Mr. Roper, in proposing a vote of thanks to the Directors of the Company for their hospitality, said they all hoped Mr. Townsend would speedily be restored to the best of health.

Mr. Ingham, seconding, said the success of junior associations was due very largely to the ready manner in which owners and managers of works gave facilities for inspection. Their encouragement was a most valuable factor in the interests of the Juniors themselves, and therefore of the industry at large.

Mr. Bateman undertook to convey the vote of thanks to the Directors.

Metropolitan Gas Company of Melbourne.—In their capacity as Agents for the Company, Messrs. John Terry & Co., of No. 7, Great Winchester Street, E.C., have received a cablegram from the Metropolitan Gas Company of Melbourne, informing them that the profits for the six months to Dec. 31 were £139 519. A dividend of 6s. 6d. per share has been declared; an amount of £42,000 has been transferred to reserve account, and a sum of £68,877 has been carried forward. Dividends were payable in Melbourne probably on the 1st inst., and those to absentee shareholders will be posted by an early mail.

Pudsey Gas Company.—The sales of gas by the Company during the year ended Dec. 31 show an increase of 9·57 p.ct. over the quantity sold in 1921. On Jan. 1 this year, the declared calorific value of their gas was altered from 500 to 540 B.Th.U.; and also from the date named the price of gas was reduced to 9·8d. per therm. An extraordinary meeting will be held after the ordinary meeting next Tuesday, when the proprietors will be asked to give the Directors power to raise the unissued capital (£2713). An interim dividend was paid at the rate of 9 p.ct. per annum on the new consolidated 7 p.ct. stock, and the Directors recommend a dividend for the past half year at the rate of 9 p.ct. per annum.

Scarborough Gas Company.—After providing for interest charges and the dividends on the preference stock, the Directors recommend the payment of the usual dividends on the ordinary stocks for the year ended Dec. 31 at the rate of 5 p.ct. per annum, on each of which 2½ p.ct. for the half year to June was paid as an interim dividend. After making the above provisions, there remained a sum of £4574, which has been placed to the credit of reserve account; being approximately one-half of the amount withdrawn last year owing to the coal strike. The sale of gas for the year shows an increase of nearly 8 million c.ft. (1·7 p.ct.) over the previous twelve months. The meter-rents obtaining prior to 1918 were reverted to during the third quarter of the year—the 50 p.ct. increase having been withdrawn. A carburetted water-gas plant, with waste-heat boiler, has been installed and successfully put into operation. After the ordinary meeting next Saturday, there will be an extraordinary general meeting, to authorize the Directors to raise additional capital and to make an application to the Board of Trade for an Order under the Public Utility Companies (Capital Issues) Act, 1920.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Cast-Iron or Steel Mains.

SIR,—Mr. Parkinson's communication in your issue of Jan. 10 prompts me to write as follows.

A cast-iron main may break at any time during its life. However, its life, in ordinary soil, is apparently everlasting (cast-iron pipe laid by Louis XIV. is still in use). After (say) fifty years, which material is more apt to be the source of dangerous leaks, cast iron or steel?

United Gas Improvement Company, Philadelphia Gas-Works, Jan. 25, 1923.

WALTON FORSTALL, Engineer of Distribution.

REGISTER OF PATENTS.

Recovering Hydrocyanic Acid.—No. 190,961.

MUELLER, M. E., of New York.

No. 10,174; April 10, 1922.

In the extraction or recovery of hydrocyanic acid from coal gas by means of copper compounds in the presence of ammonia, the solution obtained contains, besides ammonium cupro-cyanide, hydrogen sulphide combined as ammonium sulphide. If the solution thus obtained is distilled with dilute sulphuric acid, the copper present in solution is converted either in whole or in part to cuprous sulphide, and the cyanogen is liberated either wholly or in part and distils off as hydrocyanic acid. In all cases the maximum possible amount of cuprous sulphide will be formed. If there is an excess of hydrogen sulphide over the amount necessary to form cuprous sulphide with all the copper in solution, then on distilling the solution with dilute sulphuric acid the copper will be precipitated completely as cuprous sulphide and the cyanide completely liberated as hydrocyanic acid. The excess of hydrogen sulphide will also be liberated and will contaminate the hydrocyanic acid. If there is an insufficiency of hydrogen sulphide to combine with all the copper in solution as cuprous sulphide, then on distilling the solution with dilute sulphuric acid the hydrogen sulphide will be completely precipitated as cuprous sulphide, and none will be driven off. In this case the excess of copper over and above that converted to cuprous sulphide will be converted to insoluble cuprous cyanide (CuCN), which is not decomposed by dilute sulphuric acid. Any excess of cyanide above that required to form cuprous cyanide with the excess of copper over the equivalent amount of hydrogen sulphide will be liberated and distil off. In order that no hydrogen sulphide be distilled off with the hydrocyanic acid, it is therefore necessary that there should be present in the solution at least two atoms of copper for each molecule of hydrogen sulphide.

The above actions take place when starting with a cuprous compound. It is, however, possible, says the patentee, to obtain substantially the same results under the present invention by starting up the process with a cupric compound such as copper sulphate or copper oxide. The cupric compound in this case becomes converted into a cuprous compound in the operation, and would be used over again as a cuprous compound. The only difference would be that on distilling the solution with sulphuric acid the copper would in part be precipitated as cupro-sulphocyanide instead of as cuprous sulphide and cuprous cyanide.

The process covered by the present invention is based on the recognition of the foregoing conditions, and consists of the following steps as pointed out in the claims:

The steps consist in absorbing the hydrocyanic acid by means of a copper compound in the presence of water, whereby a solution of a double ammonium copper cyanide is formed in which at least two atoms of copper are present for each molecule of hydrogen sulphide, and then distilling such solution with dilute sulphuric acid, whereby hydrocyanic acid is liberated and the copper present completely precipitated as cuprous sulphide and cyanide.

To the solution of double ammonium copper cyanide is added an excess of cuprous cyanide, and the solution is boiled to drive off the carbon dioxide; the cuprous cyanide precipitating any hydrogen sulphide present as cuprous sulphide, which is returned to the first step for treating more gas. The solution is then distilled with dilute acid capable of liberating hydrocyanic acid.

The precipitated cuprous cyanide is returned to subsequent batches of solution to precipitate further hydrogen sulphide, and to prevent loss of cyanide on boiling off the carbon dioxide.

Calorimeters.—No. 190,650.

IGRANIC ELECTRIC COMPANY, LTD., of Queen Victoria Street, E.C. 4.

A communication from the Cutler-Hammer Manufacturing Company, of Milwaukee.

No. 1766; Jan. 20, 1922.

This invention relates to apparatus for determining and also indicating the total available heat of a flow of combustible fluid, although certain features of the invention are also applicable to other than combustible fluids. More particularly it relates to the ascertainment of the product of the total or gross available heat per unit quantity of a fluid and the total quantity of such fluid flowing in a given or unit time.

In the production of illuminating gas and also in numerous chemical and other industrial processes involving the use of heat derived from gaseous or other fluid, it is desirable, as pointed out in the introduction to this specification, to ascertain not only the quantity of fluid supplied per unit time and the total available heat per unit quantity of the fluid, but also to ascertain directly the total quantity of heat available from the flow of such fluid during a given or unit time; the total or gross available heat being understood to be the total quantity of heat units which may be derived from the fluid through subjection thereof to the contemplated treatment or cycle. The present invention has among its objects that of providing improved and refined apparatus for ascertaining such value directly.

Another object is to provide apparatus for the foregoing purposes utilizing a minimum number of special parts, and which may with a minimum of time and labour be applied to existing apparatus. Another object is to provide apparatus for indicating and also for recording simultaneously both the rate of flow of the fluid and the heating value per unit quantity thereof, and also the total available heat of such flow per unit time or throughout a given period.

The invention may be said to consist broadly in the provision of means to act on an indicator for causing the same to indicate as a function of both the available heat per unit quantity and the quantitative flow per unit time of a stream of fluid.

We are unable to reproduce the considerable detail of this specification, which describes a development of the Thomas Calorimeter, concerning which an article appeared in Vol. CLIV., p. 80, of the "JOURNAL."

Gasification of Coal.—No. 191,119.

PEARSON, E. J. & J., LTD., and DEELEY, J. C., both of Stourbridge.

No. 24,870; June 20, 1922.

It has been proposed, say the patentees, to combine as a single structure two gas producers and two retorts for the manufacture of coal gas, water gas, or producer gas, or for the manufacture of a combination of any two or three of these gases; and this invention provides such an apparatus; the feature being that, built as a single structure, each retort extends downwardly into a lower chamber in the base of the apparatus, which chamber is provided with a side exit for emptying and for interchange of closed bottom and fire-bars in the base of the chamber. A steam supply is arranged below the fire-bars, so that the retorts can either all work for the complete gasification of coal, or for the production of straight coal gas, or so that straight coal gas may be produced in one of them and a gas resulting from a complete gasification of coal in another or others of them, and *vice versa*; all due to the interchangeability of the closed bottom and fire-bars of the lower chambers.

Immediately above the lower chamber of each retort, provision is made for the admission of additional steam into the retort.

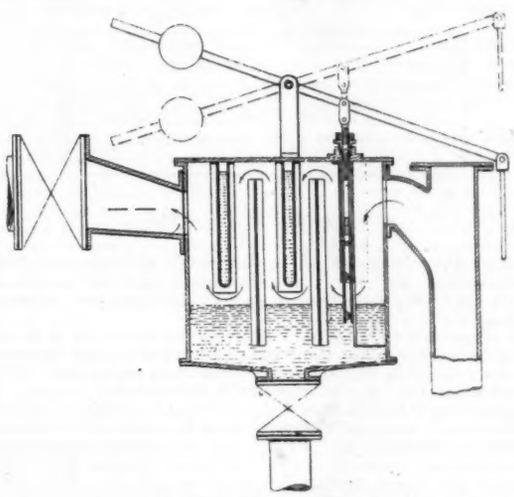
Hydraulic Main and Washer.—No. 191,226.

CROXTON, F. W., of Llandrindod Wells.

No. 29,951; Nov. 10, 1921.

The object of this invention is to provide an improved form of valve for hydraulic gas-mains which admits of the flow of gas from the retort being readily regulated, or shut off altogether to allow of charging or discharging the retort. A washer is also preferably provided in conjunction with the valve so that the gas, after passing through the latter, is caused to come into contact with a constantly cool and wetted surface.

The improved valve, which is clearly illustrated by the accompanying vertical section, consists of two plates pressed apart by springs and



Croxton's Hydraulic Main.

arranged to slide between two partitions arranged in front of the gas opening from the retort, and depending from the top of the main to within a short distance from the surface of the water, so as to allow of an uninterrupted flow of gas beneath the partitions when the valve is raised. By lowering the valve the gas flow is more or less restricted or entirely shut off. Where a number of retorts are employed leading into the same hydraulic main, the gas aperture leading from each retort is preferably enclosed by a separate partition of a rectangular box of U-formation, the aperture between the lower edge of the front of the partition and the surface of the water being adapted to be entirely or partly closed by a separate valve. The gas supply from any particular retort may thus be cut off without interfering with the supply

of gas from the others. The gas, after issuing through the valve or valves, may be arranged to pass over a baffle or baffles (as shown), so as to come into contact with the cool and wetted sides of one or more transverse troughs kept constantly filled with water, which overflows through perforations near the upper edge of one side of the trough.

Tar Distillation.—No. 191,295.

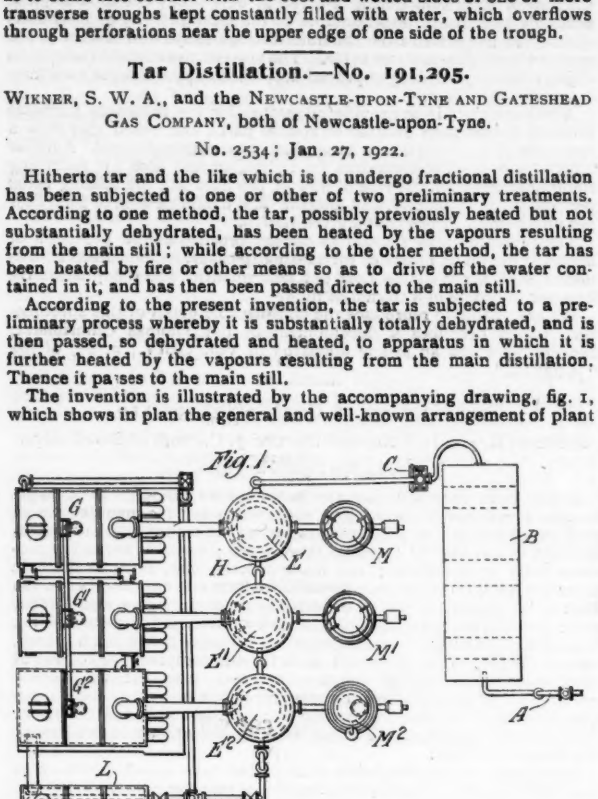
WIKNER, S. W. A., and the NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY, both of Newcastle-upon-Tyne.

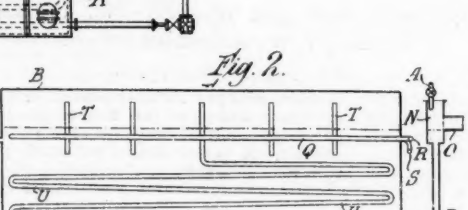
No. 2534; Jan. 27, 1922.

Hitherto tar and the like which is to undergo fractional distillation has been subjected to one or other of two preliminary treatments. According to one method, the tar, possibly previously heated but not substantially dehydrated, has been heated by the vapours resulting from the main still; while according to the other method, the tar has been heated by fire or other means so as to drive off the water contained in it, and has then been passed direct to the main still.

According to the present invention, the tar is subjected to a preliminary process whereby it is substantially totally dehydrated, and is then passed, so dehydrated and heated, to apparatus in which it is further heated by the vapours resulting from the main distillation. Thence it passes to the main still.

The invention is illustrated by the accompanying drawing, fig. 1, which shows in plan the general and well-known arrangement of plant





Wikner's Tar Dehydration Plant.

for effecting the distillation of tar, with certain additions according to this invention. Fig. 2 is a diagrammatic longitudinal section, and fig. 3 a plan of preferred apparatus for effecting the preliminary dehydration of the tar.

The crude tar is delivered through a pipe A to apparatus B, in which substantially the whole of the moisture is removed. The dehydrated tar is then forced by a pump C to a vessel E, in which there is a coil through which the vapours from one of the main stills G pass. The dehydrated tar is further heated in the vessel E, from the bottom of which it flows by a pipe H to a second vessel E^1, similar to E, and thence to a third similar vessel E^2. From E^2 the tarry liquid passes to a coil K in a pitch-vat L, wherein it is further heated and then passes to the first main still G and then to the other stills G^1, G^2. The vapours from these stills G, G^1, G^2, pass to the coils in the vessels E, E^1, E^2, where they are cooled and are then condensed in M, M^1, M^2. The pitch from the still G^2 passes to the vat L.

Referring to figs. 2 and 3, which give details of the apparatus B, the pipe A delivers the crude tar into a chamber N provided with an overflow O from which any surplus tar delivered passes back to the reservoir. This chamber communicates, through a pipe P, with the bottom of the tank B, the level of the tar in which is therefore kept constant at the level of the overflow O. Just below the level of the liquid is a series of pipes Q, to which steam can be introduced through a pipe R and from which it passes away through a pipe S. The water vapour and any other vapour, which are driven off from the liquid by the heat in the pipes Q, pass down through pipes T to coils U in which the vapours are condensed, so that no heat is lost; and the condensed vapours flow away from these coils U, which may be connected if desired to a small condenser. The dehydrated tar is removed from the tank B through a pipe V by the pump C.

It has been found, says the patentees, that as a result of this treatment it is possible efficiently to distil in certain plants double the amount of tar per day that was possible when either preliminary treatment was employed alone, and that the cost per ton of tar is considerably reduced.

Cooling Coke.—No. 191,235.

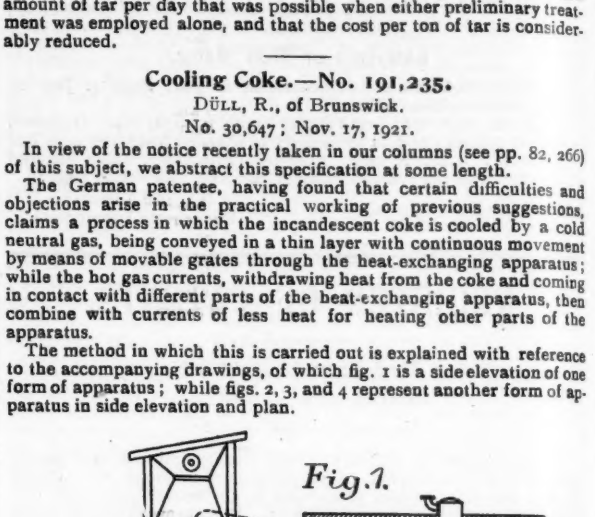
DÜLL, R., of Brunswick.

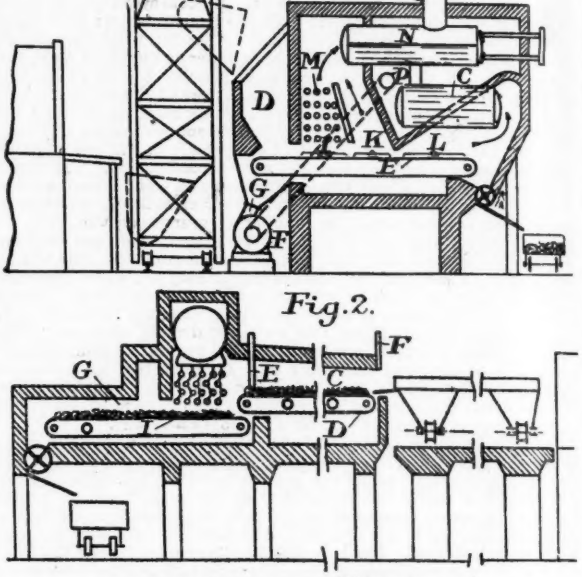
No. 30,647; Nov. 17, 1921.

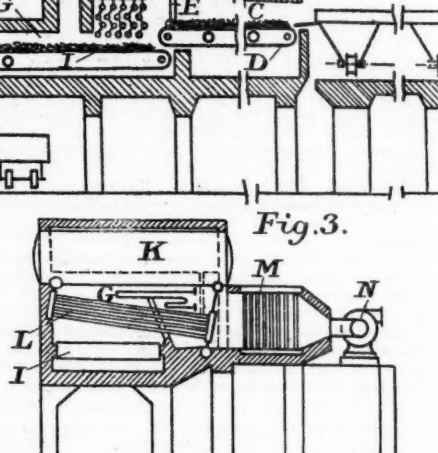
In view of the notice recently taken in our columns (see pp. 82, 266) of this subject, we abstract this specification at some length.

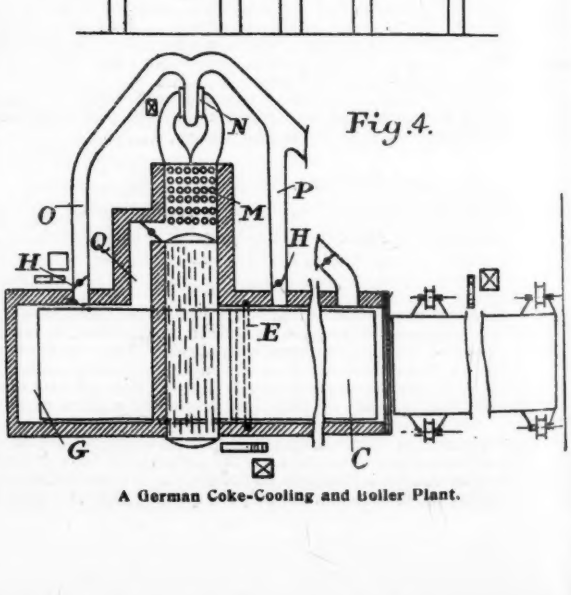
The German patentee, having found that certain difficulties and objections arise in the practical working of previous suggestions, claims a process in which the incandescent coke is cooled by a cold neutral gas, being conveyed in a thin layer with continuous movement by means of movable grates through the heat-exchanging apparatus; while the hot gas currents, withdrawing heat from the coke and coming in contact with different parts of the heat-exchanging apparatus, then combine with currents of less heat for heating other parts of the apparatus.

The method in which this is carried out is explained with reference to the accompanying drawings, of which fig. 1 is a side elevation of one form of apparatus; while figs. 2, 3, and 4 represent another form of apparatus in side elevation and plan.









A German Coke-Cooling and Boiler Plant.

According to fig. 1, the coke expelled from an oven chamber into the coke receptacle of a portable elevator is conveyed to boiler apparatus where, while still incandescent, it is conveyed into the feed apparatus D of a chain grate E. The cooling of the coke is carried out by providing that the coke is always encountered by cold gas—*i.e.*, carbon dioxide, or nitrogen, or waste gases—by a fan F keeping the gas constantly in circulation in the boiler apparatus. The fan F conveys the cooling gas through a pipe G beneath the chain grate E, where it is heated in the layer of incandescent coke and from which it is again conveyed to the separate elements of the boiler simultaneously and in zones according to its temperature. Those gases which pass through the coke in zone I of the chain grate—that is to say, are heated the most—take their course over the superheater M, then pass on through the actual steam-boiler N, and thence on the outside of the boiler and along the feed-water heater C to the flue P. The gas which is heated in the zone K of the chain grate takes a similar course; only it is conveyed along the side of the superheater. The gas which passes through zone L of the grate, and is comparatively little heated, first flows beneath the preheater C, heats the latter externally, and then travels through its system of tubes back to the flue P, after it has given up its heat to the preheater. The fan draws the cooled gas from the flue P, and conveys it afresh into a similar course.

The coke which has undergone cooling in passing over the chain grate falls into a discharge hopper, and after going through a rotary closing valve, if necessary, is sprayed with water, and can then be loaded into a truck for dispatch.

Another possible construction is illustrated in figs. 2, 3, and 4, which has the great advantage of obtaining a great saving of coke in the course of its cooling. The coke cake coming from a coke-oven is forced unbroken into an entirely closed portable box, in order to reduce as far as possible the losses by radiation. The box is then turned over on its flat side in the ordinary way, and so conveyed in front of the heat-exchanging apparatus. This has a preliminary chamber C in which a conveyor band D is placed for receiving the coke expelled from the box. A slide E, located at the other end of the preliminary chamber, remains at first closed in order that the cooling operation in the chamber G may take place continuously without any interruption during the introduction of the coke. When the coke is forced into the preliminary chamber C, the door F is closed, and the slide E and valves H for the gas admission are opened, so that the front chamber also can be utilized for cooling the coke. By the division of the conveyor band in two belts D and I, and also by their having different speeds, a rapid cooling of the coke in consequence of the reduction in the thickness of the layers is obtained owing to the loosening and distributing of the coke cake.

The heated gas in its course to the fan N gives off its heat to produce steam and hot water in the respective apparatus, and the cooled gas goes back to the cooling chamber by means of pipes O and P.

This apparatus also admits of a division of the gas current—that of lower temperature being conveyed directly to the feed-water heater M, avoiding the boiler K and the superheater L by means of the passage Q, while a valve is provided for regulating the quantity of gas.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Jan. 31.]

Nos. 1882 to 2578.

BAYNES, F. W.—"Means for charging generators of gas-producers." No. 2203.
BAYNES, F. W.—"Generators of gas-producers." No. 2204.
BAYNES, F. W.—"Means for generating steam in gas-producers." No. 2205.
BEARD, G. F. H.—"Gasholders." No. 2151.
BONN, C. R. H.—"Apparatus for indicating pressure, velocity, and/or volume of fluids." No. 2532.
BROWN, W. H.—"Gas or oil cooking stoves." No. 1885.
CLEMENTS, A.—"Taps and cocks." No. 2311.
COKE AND GAS OVENS, LTD.—"Apparatus for production of neutral ammonia sulphate." No. 2077.
DAVIDSON, W. B.—"Treating illuminating gas containing naphthalene." No. 1945.
DEMPSTER, LTD., R. & J.—See Beard, G. F. H. No. 2151.
ENDERSEN, J.—"Means for supplying and cutting off gas to incandescent burners." No. 2008.
FORSHAW, A.—"Calculating-devices for consumption of gas, &c." No. 2374.
GAGG, A.—"Rotary valves for pipe lines." No. 2189.
GLEED, A.—"Safety indicator for gas-taps." No. 2375.
GREENE, F. C.—"Carbonizing coal." No. 1922.
HAMILL, W. W.—"Fluid-flow meters." No. 1988.
HUGUENIN, A.—See Gagg, A. No. 2189.
JOHNSTON, A. G. KENT.—"Means of lighting, &c., gas-lamps from a distance." No. 2397
LAUCKS, I. F.—See Greene, F. C. No. 1922.
PEEBLES, T. A.—"Regulation of combustion." No. 1923.
PETTERS, LTD.—See Baynes, F. W. Nos. 2203, 2204, 2205.
SCOTT, J. W.—See Beard, G. F. H. No. 2151.
SPENCER, J. A.—"Grids and their supports for gas-purifiers." No. 2029.
STILL, C.—See Coke and Gas Ovens, Ltd. No. 2077.
STONE & CO., LTD., J.—"Means for connecting service pipes to mains." No 1961.
SULZER FRÈRES SOC. ANON.—"Coke-cooling plants." No. 2415.
WELLS, A.—See Stone & Co., Ltd., J. No. 1961.
WESTWOOD, W. W.—"Gas-retort mouthpieces." No. 2273.
WHITEHOUSE, J. M.—"Conveying coal." No. 2405.

The Bolton Gas Committee have received a letter from the Horwich District Council expressing a strong opinion that the price of gas in their area should be reduced to that in Bolton borough. The Committee decided that they could not concede the application.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following further notice has appeared in the "London Gazette" with regard to an application to the Board of Trade for an Order under the Gas Regulation Act.

Colwall Gas Company, Ltd.

The maximum price now authorized in respect of the supply of gas by the undertakers is 7s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

SULPHATE OF AMMONIA PRICES.

March to May.

In a circular-letter to fertilizer manufacturers, &c., dated last Monday, the British Sulphate of Ammonia Federation, Ltd., say there is a large demand for sulphate of ammonia, and recognizing the severe depression now prevailing in agriculture, it is their wish to give British farmers every chance of securing all they require at the present price. They are therefore willing to book at the February price, up to the limit of available production, all orders received by them by Feb. 24 for delivery during March, April, and May.

After Feb. 24, the price for March-April-May delivery will be raised by 5s. per ton, and will therefore be £17 3s. per ton for neutral quality in fine friable condition, free from lumps, basis 25⅝ p.ct. ammonia, delivered to consumer's nearest station or wharf in Great Britain, in lots of 4 tons and upwards. The weekly surplus production not covered by home orders will be sold for export. Limited quantities of ordinary quality will be available in some districts, and will be sold at 23s. per ton less than the above prices, basis 25¼ p.ct. ammonia. Quantities offered at these prices may not be exported in any circumstances. The usual extra charges will be made for lots of less than 4 tons.

BETHNAL GREEN BOROUGH COUNCIL AND CARBON MONOXIDE.

The Bethnal Green Borough Council, at the meeting on the 1st inst., decided, on the recommendation of the Public Health Committee, to ask the Prime Minister to appoint a Committee to investigate the composition of gas supplied by various undertakers, to report whether it is practicable substantially to reduce the amount of carbon monoxide therein, and also to consider and report as to the tests which should be made by gas undertakers from time to time to ascertain the condition of mains, services, consumers' fittings, and other apparatus. Copies of the resolution were directed to be sent to the Minister of Health, the President of the Board of Trade, the local Members of Parliament and of the London County Council, the Metropolitan Borough Councils, and the Metropolitan Boroughs Standing Joint Committee, with invitations to support the resolution.

The Public Health Committee, in their report, stated that, arising out of the fatalities at Gales Gardens, they had considered the public health aspects of the matter, and were strongly of opinion that the number of deaths from gas poisoning was such that further inquiry to that conducted by the Departmental Committee some years ago should be made. They anticipated that such investigation would show the percentage of carbon monoxide to be greater in the gas of some undertakers than of others; and, if this were so, it became a matter for inquiry whether there was need for the higher percentages, if the lower percentages of carbon monoxide were satisfactorily used.

Mr. Snelling, in the course of a heated discussion, said the Ministry of Health should have taken up the matter long before, in the interests of the people. Mr. Elsbury and subsequent speakers suggested that the Borough Councils should pool their resources of electricity and entirely do away with gas. Under their housing scheme, they were providing electric light for 1s. 3d. a week, which he was sure was a great deal cheaper than gas; and what could be done in illumination could be done in heating. Mr. Vaughan strongly attacked the gas companies. Mr. Pickering (Chairman of the Electricity Committee) said they were getting on with the work of laying electricity all over Bethnal Green.

British Dyestuffs Preference Dividend Passed.—The Directors of the British Dyestuffs Corporation announce that the trading results to Oct. 31, 1922, do not permit of the payment of a dividend on the non-cumulative preference shares in respect of the financial period ended at that date. The report and accounts will be issued to the shareholders as soon as certain matters still outstanding with the Revenue Authorities have been settled.

Weymouth Consumers' Gas Company.—The accounts of the Company for the half year ended Dec. 31 show the quantity of gas sold to have been 451 952·30 therms, which is equal to 98,250,500 c.ft., an increase of 1,276 600 c.ft. upon the quantity sold in the corresponding half of 1921, or 1·31 p.ct. The financial results of the half-year's working have, the Directors report, been most satisfactory; the balance on net revenue account being £8816, after providing for interest on the debenture stock. The Directors recommend the payment of a dividend for the half year on the ordinary stock at the maximum rate of 5 p.ct. per annum, less income-tax. During the whole of 1922 the sales of gas amounted to 188,832,700 c.ft. This compares with 185,022,100 c.ft. for 1921, and is an increase of 2·05 p.ct. It is with much regret that the Directors have to report the death of one of their colleagues, Mr. Thomas Henry Williams, J.P., who for a period of about 23 years faithfully carried out the duties of a Director, and during a little more than one-third of this time was Deputy-Chairman.

THE GAS LIGHT AND COKE COMPANY.

Ordinary General Meeting.

The Two Hundred and Sixteenth Ordinary General Meeting of Proprietors was held last Friday, at the Chief Office, Horseferry Road, Westminster—Mr. D. MILNE WATSON (the Governor) in the chair.

The SECRETARY (Mr. W. L. Galbraith) read the notice convening the meeting; and the seal of the Company was affixed to the "Register of Proprietors." The report and accounts were taken as read.

THE GOVERNOR'S ADDRESS.

The GOVERNOR: Ladies and Gentlemen,—Before proceeding to deal with the accounts in detail, I should like to refer to the great loss which the Directors have sustained during the past year by the death of their late colleague, Sir Daniel Ford Goddard. Sir Daniel had been a Director of the Company for six years, and during that time not only endeared himself to us as a man, but was a most valuable aid in our counsels, having great experience and influence both in the gas industry and in the political world. His loss is deeply deplored by us. The Directors have filled the vacant place on the Board by electing Mr. Harold Brewer Hartley as a Director. Mr. Hartley has had lifelong experience in chemical matters; and his knowledge will be of the greatest benefit to this Company, which, as you are aware, has a large chemical side to its activities.

THE CAPITAL ACCOUNT.

Dealing now with the accounts, I should like to point out that from July 1 they include the figures of the Ilford Gas Company, with which we amalgamated at that date; and this must be borne in mind in considering the various items in the accounts. Taking first the capital account, you will see that we have spent £54,820 on new and additional mains, £84,549 on new and additional meters, and £186,732 on new and additional stoves—making a total expenditure of £326,101. Against this we have written-off the sum of £416,000—£329,000 of which was in respect of special depreciation of ships, which we have now written-down to a reasonable figure per ton. There has, therefore, been a reduction in the fixed capital of the Company of £90,000. The total capital, including Ilford, now amounts to just under £30,000,000.

LARGE INCREASE IN BUSINESS.

I propose now to pass to the revenue account. It is gratifying to report that there has been an increase of 8½ p.ct. in the business of the Company during the year. This, I think you will agree with me, is very satisfactory, considering the industrial depression which exists in London, as generally throughout the country. The receipts for residuals may also be regarded as satisfactory, though there is a decrease in the revenue from coke of £576,000, due to the fact that the prices for coal and other fuels have gone down very materially during the year.

FALLING COSTS.

On the debit side of the account you will see that, after having made a charge in respect of depreciation of ships, to which I have already referred, we have made a saving in coal of £1,070,000, and have also made a saving in oil of £317,000. These are big figures. Wages and salaries, both in manufacture and distribution, show a decrease, though from the figures given in the report the salaries do not appear to have come down to the same extent as wages. This is not, however, actually the case, as there has been a considerable addition to the number of officers, owing to transfers from the weekly staff during the past year. Large reductions in salaries have been made. You will see that repair and maintenance charges were nearly the same as in 1921. In one or two cases the expenditure was even a little higher. The reason why there has not been a decrease is that, as you are probably aware, the Company had enormous arrears of repairs to overtake after the war. These deferred repairs in the case of works and plant, I am glad to say, are almost completed, and there should be a reduction of expenditure under this heading in the future.

CONTRIBUTORY PENSION SCHEME.

You will notice there has been an increase in the charges for annuities to officers and workmen. This is due to the initiation of a contributory pension scheme for the workmen, which commenced its operation on Jan. 1 of the current year. In order to start a fund of this description, it is necessary that a lump sum should be placed to its credit; and part of the total amount required has been accumulated and charged against the item of annuities during the year under review.

IMPROVED FINANCES.

I am glad to say that the past year has been a successful one, not only from the point of view of sales of gas, but also from the point of view of the Company's financial position. At the end of 1921 we owed our bankers over three-quarters of a million; now the position is that we have on deposit the sum of £400,000, and £207,364 invested—a very nice turnover. This shows that the Company is in a strong and healthy position. This is most important in view of the troubles at present existing in Europe, and the great uncertainty as to markets generally. The results of the past year are eminently satisfactory, not only for the shareholders, but also for the consumers.

STEADY FALL IN THE PRICE OF GAS.

Look at the price of gas. At the end of 1921 it was 1s. 2d. per therm, and is now 10d. per therm; or, for the benefit of those who prefer to think in cubic feet, at the end of 1921 the price per 1000 c.ft. was 5s. 6½d., and now it is 4s. 2d. The reductions made during the year represent an actual saving to the consumers of the Company of £1,306,000. The accounts, it is true, only show £628,000; but the reason for this is that there has been an increase in the consumption of gas.

ANOTHER REDUCTION ANNOUNCED.

Well, we have not "shot our bolt" yet. As was announced in the papers on Wednesday and Thursday of this week, the Directors have given notice of a further reduction in the price of gas from 10d. to 9·2d. per therm, or from 4s. 2d. to 3s. 10d. per 1000 c.ft., as from the taking of the meter indices in March. I am sure that this reduction will give general satisfaction. The price of gas in 1913 was 2s. 6d. per 1000 c.ft. Therefore our price just announced will be very little more than 50 p.ct. above the pre-war price. The increase in the cost of living is now stated to be about 80 p.ct., so that the price of gas is well below the general average price of commodities in this country at the present time. This is a complete answer to the assertion sometimes made that too much is being charged for gas. There should be nothing but satisfaction with this price; and I look forward with confidence to the use of gas for all purposes being considerably extended.

THE DIVIDEND.

Coming now to the dividends, the Company paid a dividend of £5 4s. per annum in respect of the half year ended June 30; and they now recommend a similar dividend for the December half year. This, together with dividends on the preference and maximum stocks, and the other charges recommended, will absorb £599,000, leaving a sum to be carried over to the credit of the next year of £244,000, as against £148,000 for the year before. We have carried £50,000 to the special purposes fund, and propose placing the sum of £22,000 to the reserve fund. To sum-up, the accounts for the year show that in respect of the June half year, dividends have been paid at the rate of 4 p.ct. per annum on the 4 p.ct. preference stock, 3½ p.ct. per annum on the 3½ p.ct. maximum stock, and £5 4s. p.ct. per annum on the ordinary stock; and out of the available balance of £843,000, the Directors recommend payment of the following dividends in respect of the December half year:

> 4 p.ct. per annum on the 4 p.ct. preference stock, 3½ p.ct. per annum on the 3½ p.ct. maximum stock, and £5 4s. p.ct. per annum on the ordinary stock, together with the sum of £22,000, to which I have already referred, to be carried to the reserve fund, and a sum of £20,000 to the redemption fund.

With regard to £5 4s. p.ct. per annum dividend which we recommend for the December half year, no doubt some of the shareholders may have expected the distribution of a higher dividend, as the present standard price would have permitted the payment of £6 10s. 8d. p.ct. per annum. It should be remembered, however, that this latter figure is in accordance with the standard price of gas fixed in March, 1921, when circumstances were altogether different. The Directors feel that it would not be in the best interests of the shareholders themselves if they were to pay a dividend at a rate that might be proved excessive; and in the circumstances they consider it is the wiser policy to maintain for the second half of the year the same dividend as was paid for the June half year. The Directors believe that the policy of paying a moderate dividend, which it is hoped can be maintained, is the wiser one to pursue. The sum of £22,000 which has been carried to the reserve fund will be available for the purpose of paying dividends, should at any time the profits of the Company prove insufficient for the purpose.

THE THERM SYSTEM OF CHARGE.

The last six months of 1922 have been marked by attacks on the gas industry in the Press and elsewhere with regard to the therm system of charging, and latterly with reference to carbon monoxide in the gas. With regard to the therm system of charge, in July last it happened that the accounts for gas for the June quarter were in many cases larger than usual, and someone wrote to the Press saying that this was due to the therm system of charging. This view was strongly taken up by a number of newspapers, and, needless to say, was seized upon by a certain number of gas consumers whose bills were higher than usual, and who considered, for that reason, they had a grievance. It is interesting to mention that each quarter as it comes round finds a certain number of consumers who contend that their bills are too high, and who write complaining to the Company. If you have over 800,000 consumers, you must expect some complaints. On this occasion the suggestion in the Press that the therm was responsible provided a convenient but ill-founded excuse. ["Hear, hear."]

WHY SOME GAS BILLS WERE HIGHER.

What, then, were the real reasons for the June accounts last year being higher in some cases? First, the weather in that quarter of 1922 was exceptionally cold, whereas in 1921 it was exceptionally warm. Secondly, there were no restrictions in the use of gas, whereas during the corresponding period in 1921 the national coal stoppage was taking place, and consumers were directed to reduce the use of gas to a minimum. Thirdly, in the case of this Company a larger number of days were included in the June quarter, 1922, than usual, as it was not feasible on that occasion to read the meters at the usual date. It had absolutely nothing whatever to do with the therm. [Applause.] Fortunately, the great majority of the consumers who complained were perfectly satisfied when they understood the cause of the higher bills; and, so far as this Company is concerned, the complaints practically died away, and are now less than usual.

ALL AUTHORITIES APPROVE THE THERM.

The agitation in the newspapers having been started, however, on the assumption that the therm was to blame, was continued; and ultimately such pressure was brought to bear upon the authorities that the Board of Trade appointed a Committee to inquire into the system of charging by the therm. This Committee has held five sittings, and a great mass of evidence has been given before it. It is particularly interesting to note with regard to this evidence that there is practically a unanimity of opinion that the therm system of charging for gas is the correct and fair one. This is the view, not only of such well-known scientific men as Prof. Boys, Mr. Butterfield, Sir Dugald Clerk, Prof. Cobb, and Dr. Lander, but also of such representative large users of gas as the London County Council, the Corporation of London, and the railway companies. The only people who appeared to be opposed to the therm system were those who were obviously misinformed. One witness said: "We do not want heat in gas"—showing that the

witness was not aware of the simple fact (I thought known to everybody) that it is on the heat content of gas, whether for lighting or heating, that its modern utility depends. During the course of the inquiry, however, other points were dealt with by witnesses, though many of these points were not within the terms of the reference to the Committee, and the question of gas apparatus was discussed at length. More than one witness suggested that consumers of gas were dissatisfied because their appliances were not suitable for the gas now being supplied. On that point, I would say, first of all, that no change has been made in the calorific value of our gas that has affected the efficiency of consumers' appliances. The Company has pursued the policy, extending over many years, of supplying suitable appliances for burning this Company's gas, and employs a large staff on the work of installing apparatus and maintaining it. As the report shows, last year there was an increase of nearly 65,000 in the number of gas-stoves sold and on hire; and these were all up-to-date appliances. Naturally, immediately after the war it was very difficult to get new apparatus; but this difficulty has been ended for some time, and all apparatus issued is thoroughly up-to-date. I may add that no piece of apparatus is ever fixed without being thoroughly examined and adjusted.

CONDITION OF MAINS.

Coming now to the question of carbon monoxide, this matter has been raised at this time mainly owing to the most unfortunate accident at Bethnal Green, in which three persons, to our great regret, lost their lives. With regard to the particular main from which the gas escaped, it was laid in the year 1880, and when examined after the accident was found to be in perfectly good condition. The accident was caused by the subsidence of the soil in which it was laid, and of which there was no evidence on the surface of the road, and by a portion of the pipe being held up by brickwork, thus causing an undue strain. The condition of the main had nothing whatever to do with the accident, because it was in a perfect condition. I can assure the public that the mains in the Company's district are in good condition, and that examinations which, day in, day out, and all the year round, are made by our expert main inspectors when the streets are being repaired, prove that this is so. The number of fatal accidents due to escaping gas from mains in the streets finding its way into houses amounts to a total of only 19 during a period of 22 years—or less than one a year in a population of four to five millions.

NO CHANGE IN GAS SUPPLY.

Last year when I addressed you, an agitation with regard to carbon monoxide had just been taking place, and I dealt with the question fully at that time; but in view of what is being said at the present moment, it is well that I should once more state the position clearly. Carbon monoxide is present in both coal gas and water gas, of both of which it is a combustible and essential ingredient, and cannot be removed. The percentage of carbon monoxide in the mixed gas now being supplied by the Company is the same as was supplied when the war broke out, and for many years before that; and it is quite wrong to say that any of the accidents that have occurred recently have been due to any alteration in the composition of the gas. There has been no change in the method of manufacture for over thirty years. As has been pointed out before, in America some of the most important cities are supplied with carburetted water gas only. Had we, during the past twelve months, been supplying coal gas only containing 7 p.ct. of carbon monoxide, there is no reason whatever for assuming that the number of accidents would have been any fewer. Compulsory limitation in this respect would impose upon this Company, and upon the vast majority of gas undertakings in this country—whether owned by companies or by municipalities—a heavy financial burden in the provision of additional coal-gas plant, with the inevitable result of increasing very considerably the price of gas—and that without any corresponding advantage to the public.

THE COMPARATIVE SAFETY OF GAS.

The public, I think, have been impressed by the number of fatalities which have occurred recently; but I would point out that the majority of these cases are cases of suicide. There are unfortunately always bound to be people who desire to do away with themselves, and there are many methods which can be employed. It is my firm belief that the publicity which has of recent years been given to every case of suicide by gas, is directly responsible for the method having been employed with greater frequency. In a matter of this kind one is in difficulty, because one does not wish to appear unsympathetic; but facts must be looked straight in the face. We should all be only too glad if gas could be made perfectly innocuous; but it must be remembered, also, that practically everything we use or do has an element of danger—as instances, petrol, electricity, coal-fires, oil lamps and stoves, motor traction, railway travelling, &c. With regard to accidents as distinct from suicides, the following facts, I think, are rather illuminating, and show a very favourable comparison between accidents due to gas and to other causes:

Deaths due to gas represent about 2½ per million per annum of the population.

Deaths from railway accidents 22 per million per annum.

Deaths due to street accidents in London 100 per million per annum of the population.

Deaths from coal-fires are many times more numerous than from gas. In the year 1919 (the last year for which the Registrar-General's complete figures are available), not less than 992 inquests were held on children under five who had been fatally burnt through accidents with domestic coal-fires (conflagrations excluded).

It should not be forgotten that the use of gas is one of the most important means for abolishing smoke and its attendant fogs. It has been clearly shown that in our large cities one day's fog causes as many deaths as are due to gas in the whole country in twelve months. Fog has been known almost to double London's normal death rate—but this is taken, I am sorry to say, as a matter of course.

NO "ODOURLESS" GAS SUPPLIED.

It has been suggested that there is some mysterious difference in the composition of the gas supplied before and since the war, and that the gas as now supplied is odourless. This is not so; the gas being the same as it has been for many years past. I should like to emphasize this: The Company does not supply odourless gas. There is no cause for the consumers to be nervous; and they may go on using gas as they have been accustomed to do in the past, and as their forebears have done. To show you that a gas-works is quite a healthy place to live in, I may say that we have a man who has been in our service for fifty years, and his father before him completed fifty years' service with us, and so did his grandfather before him. That is a very fine record; and we are going to give the man a gold watch to celebrate the event. It certainly proves the healthiness of gas.

GAS NOW PRE-WAR QUALITY.

Another subject which has given rise to a certain amount of discussion is the question of the calorific value of the gas; and it may be well for me to say something on this subject to-day. Before the war, the Company was working to a penalty standard of 500 B.Th.U. per c.ft., but, in point of fact, was supplying a gas of a somewhat higher quality. During the war, owing to the shortage of coal, and owing to the fact that the Company was called upon to extract benzole and toluole, the quality was reduced to something like 480 B.Th.U. When it became necessary for the Company to declare, in April, 1921, a standard of calorific value of the gas to be supplied, it was decided to declare a standard of 475 B.Th.U., which was the quality then being supplied. Moreover, as at the time this decision had to be made the coal stoppage was taking place, it was not wise to declare any higher quality. As a permanent standard, however, a gas of 475 B.Th.U. was, in the opinion of the Company's technical staff, considered to be too low; and a report was presented to the Directors urging them to declare, at an opportune time, a quality more closely approximating to the pre-war quality. Accordingly, in June last, the Company increased the calorific value of its gas to 500 B.Th.U. That is the gas we are supplying to-day.

GOOD WORK OF THE STAFF AND EMPLOYEES.

Before I sit down, I should like to take this opportunity of saying how well the staff, both indoor and outdoor—officers and men (and in these I include the ladies who work for us as well)—have worked during the past trying twelve months. It is difficult to differentiate between persons who have all done their duty faithfully; but I think special reference should be made to the good work done by the Chief Engineer and the engineering staff generally, which has resulted in very considerable economies and improvements in our business.

NO FEAR REGARDING FUTURE PROSPERITY.

In conclusion, though we have been through such a sea of troubles, in my opinion the Company was never in a more healthy condition than it is at present. In the past year we have sold more gas than ever before, and have had one of the largest increases in the sale of gas appliances; and considering the national work that is being done by the gas industry in the direction of coal conservation, smoke abatement, and the production of useful bye-products, so essential to the development of the country, there can be no real fear for the future prosperity of this Company and of the gas industry generally. [Applause.] I now have pleasure in moving:

That this meeting do agree with and confirm the report of the Directors and the Auditors' report and statement of the accounts of the Company as transmitted to the proprietors on the 27th ult.

The DEPUTY-GOVERNOR (Mr. J. Lister Godlee): I have pleasure in seconding the motion.

The GOVERNOR: Before putting the resolution, I shall be happy to hear any remarks which proprietors may wish to make, and to endeavour to answer any questions.

QUESTIONS BY SHAREHOLDERS.

Mr. WICKSTEED made some remarks in regard to the Bethnal Green accident and the composition of the Company's gas, to which the Governor replied by reiterating his statements that no change had been made in its composition or methods of manufacture. After one or two other questions had been answered,

The GOVERNOR: If there are no other questions, I will put the motion to the meeting. It is carried unanimously.

THE DIVIDENDS.

The GOVERNOR: I will now ask the Secretary to read the minutes of the Court of Directors recommending dividends for the past half year.

The SECRETARY thereupon read from the Directors' minutes of the 22nd of January the following:

Resolved that it be recommended to the Ordinary General Meeting of Proprietors to be held on the 2nd prox.: (1) That the sum of £20,000 be set aside out of the divisible profits of the Company for the half year ending on the 31st day of December last towards the redemption fund, in accordance with the provisions of the Company's Acts of 1903 and 1909 and the Gas Light and Coke Company (Charges) Order, 1921; (2) that dividends as follow for such half year be declared—namely:

On the 4 p.ct. consolidated preference stock at the rate of . . . £4 0 0 p.ct. per annum
On the 3½ p.ct. maximum stock at the rate of . . . . . £3 10 0 " "
On the ordinary stock at the rate of £5 4 0 " "
All subject to deduction of income-tax; and

(3) That the sum of £22,061 9s. 10d. be placed to the credit of the reserve fund.

These recommendations were adopted, on the proposition of the GOVERNOR, seconded by the DEPUTY-GOVERNOR.

RE-ELECTION OF DIRECTORS AND AUDITORS.

The GOVERNOR: Two Directors retire by rotation at this meeting—the Hon. Clive Bigham and Mr. Harold Brewer Hartley. As I have already told you, Mr. Hartley has just come on the Board. Mr. Bigham has been a Director for some time, and is a most useful colleague. I have great pleasure in proposing his re-election.

The DEPUTY-GOVERNOR seconded the motion, which was agreed to.

The GOVERNOR: I now beg to move that Mr. Hartley be re-elected a Director.

The DEPUTY-GOVERNOR seconded the proposition, which was unanimously passed.

The Hon. CLIVE BIGHAM and Mr. HARTLEY thanked the proprietors.

The AUDITORS (Messrs. J. A. Stoneham and P. H. Ashworth) were then re-elected, on the proposition of Mr. BEVIS, seconded by Mr. HATCHWELL.

The GOVERNOR: That, ladies and gentlemen, concludes the business of the meeting,

A VOTE OF THANKS.

Mr. F. G. PILLEY: It is sometimes said that the way to get a good attendance at the meeting of a company is to reduce the dividend; but I think it can be taken that the large attendance at to-day's meeting is an assurance to those responsible for carrying on the business of the Company that we fully appreciate all that has been done by them and for us during the past twelve months. I do not think we ought to leave it merely at our attendance. We ought to place on record our very full appreciation of the services of the Governor, the Court of Directors, the officers, and the workmen of the Company. As we have seen, dissatisfaction has been very loudly voiced; but the satisfied section of the community does not usually make itself heard. We must not neglect that part of our duty to-day. We have had two classes of dissatisfied consumers. The one who turns on the tap, leaves it turned on, and then writes to the papers complaining of his bill; and the other unfortunate fellow—I am not referring to the Bethnal Green case—who turns on the tap, does not light it, and then leaves this world. In one way at any rate the latter is wiser than the former, because he does not afterwards commit the indiscretion of writing to the Press. In this Company we have always strong direction. The Governor has referred to the excellent work done by the higher officials; and I am sure you will all agree that the results shown could not have been attained without loyal and zealous service on the part of all concerned.

Mr. R. J. NEVILLE NEVILLE: I have great pleasure in seconding that.

The resolution was heartily passed by the meeting.

The GOVERNOR: In the name of my colleagues and myself, I am exceedingly indebted to you for this vote. I can assure you that we have been passing through exceedingly anxious times—as anxious times as I ever remember in connection with the Company—and it is a great help to the Board to feel that they have the support of the proprietors in the course they are pursuing.

PORTSEA ISLAND GAS LIGHT COMPANY.

Celebrating the Centenary of Incorporation.

It was the intention of the Directors of the Portsea Island Gas Company in the year 1921, on the occasion of the centenary of incorporation, to give a celebration dinner and concert to their employees. Owing to the serious situation caused by the prolongation of the coal dispute, however, and for other reasons, this had to be postponed; and the dinner took place on Friday, the 26th ult., in the Town Hall, Portsmouth. The large hall was crowded, and the enthusiasm that prevailed, and the spirit of friendship that was apparent between Directors, heads of departments, and workers gave an indication of the cause of much of the great success of the Company. Later in the evening an excellent concert was arranged.

The CHAIRMAN of the Company (Mr. T. H. F. Lapthorn, J.P.), who presided at the dinner, announced that, to mark the centenary, the Directors had decided to reduce the price of gas from 10d. to 9d. per therm—a cut of 10 p.ct., which would mean a total saving to the consumers of £35,000 a year. The Company had nineteen workers of 40 years' service and upwards who were now in their employ or pensioned, and to each of them he handed £5 as some recognition of faithful service. The oldest of these was Mr. James Oakes (80), who had served the Company no fewer than 63 years.

The MAYOR (Alderman F. J. Foster, J.P.) remarked that the right thing was for employers and employees to get together, and functions like that would go far to roll the mists away. There was happily a better understanding between employers and employed to-day, notwithstanding that there were still those in their midst who tried to stir up strife. They must all realize that if they were to make an undertaking a success, both masters and men must put their best into it, because their interests were identical.

Mr. A. ST. BARBE EMMOTT proposed "The Portsea Island Gas Light Company," and congratulated them on the completion of a hundred years of successful working. There were only two other gas companies in the country who, measuring capital with output, could compare with the Portsea Island Company. Such results as those did not fall from the heavens; they came from human brains and human energy. He paid a high tribute first to the Directors, who were the guiding star in the prosperity of the industry; secondly to the permanent officials, who, by their ability, were able to assist the Directors; and thirdly to the labour element, without which neither would be of any use. They had a strong Board of Directors, who had shown wisdom in appointing Mr. Thomas Carmichael Engineer. He also spoke of the Secretary, Mr. H. A. Stibbs, to whom he referred as an old and valued servant of the Company. The employees, too, did much for the undertaking.

Mr. WILLIAM GILLMAN, J.P., the Deputy-Chairman, in reply, said that, as they knew, the Company was established in 1821, and he presumed now, in point of size, it would rank somewhere in the first 25 establishments of a similar sort in the United Kingdom. During last year the Company manufactured over 2000 million c.ft. of gas. This was an enormous volume. The Company had about 213 miles of mains, and the number of appliances in use was something like 47,000. As showing the popularity of the slot-meter, last year 53 million pennies were taken from the automatics, representing in weight 500 tons. The Directors fully recognized the loyalty and energy of the employees; and, to show their appreciation in some tangible form, they had provided social and recreative facilities for them.

Copies of a souvenir booklet, giving historical details and other facts concerning the growth of the Company since its incorporation in May, 1821, were distributed among the guests. Portraits of the Chairman and Directors, the Engineer, and the Secretary are reproduced in it.

TRADE NOTES.

New Woodall-Duckham Verticals for Liverpool.

The Liverpool Gas Company have placed an order with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for a bench of Woodall-Duckham vertical retorts capable of carbonizing 100 tons of coal per day.

Kirke Fire-Tube Boilers.

A new booklet dealing with Kirke patent fire-tube boilers has been prepared by Messrs. Spencer-Bonecourt, Ltd., of Parliament Mansions, Victoria Street, London, S.W. It contains full illustrated particulars of this useful type of steam-boiler, for which 94·5 p.ct. tube efficiency is claimed.

Stanton Ironworks Company.

The Stanton Ironworks Company, Ltd., near Nottingham, have acquired Mr. Israel's patent for centrifugally lining metal pipes with concrete. There is nothing novel in the cement and concrete lining of metal pipes, but the method of doing this by Mr. Israel's process is novel, and is said to result in a product superior to the ordinary methods of doing this work. The Company are putting three further blast-furnaces into operation on March 1. This will mean that they will be working twelve out of their seventeen furnaces.

Underfeed Stoker Company.

A list which is before us of some of the more important recent sales of travelling grates and ash conveyors by the Underfeed Stoker Company, Ltd., of Coventry House, South Place, London, E.C., demonstrates the popularity of these appliances. The Victoria State Electricity Commission, Melbourne, have purchased 36 travelling grates, and the Hong Kong Electric Light Company two travelling grates and ash conveyors. Other installations have been for five electric light and power stations, two collieries, and a number of well-known firms in different branches of industry.

Turbine Patent Furnaces.

A list received from the Turbine Furnace Company, Ltd., shows no less than 82 sets of these patent furnaces as having been installed at gas-works in London and the Provinces. The list includes 12 sets for the Gas Light and Coke Company, 8 sets for the South Metropolitan Gas Company, and 15 sets for the Leicester Gas Department. All these furnaces are supplied with firebars which do not burn out. They can burn efficiently coke breeze, smoke-box breeze, all the lower grades of coal, many kinds of fuel not hitherto deemed usable, and are claimed to ensure the best possible results with high-grade coals. The latest addition to the furnace is a new bar for burning anthracite easily. The "Turbine" furnace can be fitted to any type of boiler in a few hours, without drilling the boiler.

Aerial Ropeways.

Messrs. George Cradock & Co., Ltd., of Wakefield, forward a copy of a substantial and generously illustrated booklet on aerial ropeways, cableways, rope shoots, &c., which are employed for transport purposes in many kinds of industrial operations. There is first of all the single, or endless running rope, system, which may be adopted with excellent results for capacities up to 80 tons per hour over ground involving moderately steep gradients. It is popular on account of the simplicity of its construction and small initial outlay, combined with low cost of maintenance. Next there is the standing and hauling rope system, which has been extensively used on the Continent for many years, and is particularly suitable for carrying heavy loads, and taking steep gradients. The loads are carried on heavy standing or rail ropes, and hauled along by a light endless moving rope. A number of actual installations are described, with accompanying photographs; one being from Messrs. N. Hingley and Sons' Saltwells Colliery to an unloading point at the side of the firm's Netherton Iron-Works, near Dudley. This ropeway, which is on the single moving rope system, has a capacity of 35 tons per hour, and is about 2300 ft. long, with a rise of some 100 ft. from the loading to the unloading terminal. It has been in daily use for three-and-a-half years, and continues to work most satisfactorily.

What Causes Paint "Failures"?

Probably nine out of every ten so-called failures of protective coatings are due to improper application, and of these failures a large percentage is owing to the fact that many paints are difficult to apply. This disability, it is pointed out, may be that the paint drags under the brush, resulting in great unevenness in the thickness of the coating; or it may be because of the heavy specific gravity of the pigment that sagging occurs. In order to avoid this latter fault, the paint is brushed out so far as to make the coat exceedingly thin. Even with expert workmen these defects are decidedly a contributing cause of paint failures. Neither of these objections is present in graphite paints. But a natural flake graphite needs something to give it further endurance; and for this reason one calls in the aid of silica. Nature's mixture of flake silica-graphite, mined only by the Joseph Dixon Crucible Company, at Ticonderoga, New York, affords, it is claimed, a much superior paint film as compared with a pigment where silica is mechanically added. For this reason Dixon's silica-graphite paint will be found an ideal protective paint for resisting heat and cold abrasion, rain and sun, dust, alkalies, brine—practically all agencies which seek to destroy exposed wood or metal constructions. It forms, upon application, a perfectly inert coating of unapproachable durability, elasticity, and flexibility. Samples and illustrated colour-card may be obtained from the manufacturers, the Joseph Dixon Crucible Company, No. 22, Duke Street, Stamford Street, London, S.E. 1.

Water Sterilizer-Softeners.

Supplies of drinking water may be satisfactorily softened and sterilized by a simple little apparatus marketed by the Lawrence Patent Water Softener and Sterilizer Company, Limited, of Parliament Mansions, Victoria Street, Westminster, S.W. A special gas-burner constitutes a very suitable method of heating the device; and the firm are

disposed to enter into arrangements with gas undertakings to manufacture for them in quantities and in their different standard sizes, for the undertakings to sell or hire to gas consumers. The Company's patent apparatus has been largely used for a number of years in various parts of the world, with satisfactory results. No chemicals are used, it is automatic in action, there are no working parts, and it is economical in operation, as compared with the cost of boiling water. There are two vessels, one called the heat "interchanger," while the other is the sterilizing-softening vessel. The water is admitted by a pipe from a tank containing the untreated water supply fixed at an elevation of about 4 to 6 ft. above the apparatus. The water passes up through the heat interchanger, and out by a pipe into the sterilizing-softening vessel. It flows therein over a series of specially formed plates, called "locators," is heated by a gas-burner, and then flows by a connecting pipe back into the heat interchanger. It is cooled therein, and flows from the outlet-pipe for storage in a suitable tank. It is to be noted that the object of the heat interchanger is to cool the treated water, and in so doing it partially heats the untreated water, thus reducing considerably the amount of heat required from the gas-burner. An automatic pattern of this apparatus ensures, by means of a special valve which is provided at the top of the heat interchanger, that the water delivery from the apparatus is stopped if the gas is stopped, so that the water cannot be delivered without being subjected to the necessary temperature; the supply of water to the apparatus being also stopped.

A Fine for Sulphuretted Hydrogen.—At Liverpool last week, the Woolton Gas Company were fined £5 for supplying on Nov. 23 gas containing traces of sulphuretted hydrogen. The Company pleaded guilty; and on their behalf it was stated that there was no complaint against the plant. The purifiers were examined every day, and on the morning of Nov. 23 were working well; there being complete freedom from any impurity in the gas. It was therefore suggested that the purifying apparatus had failed to function temporarily.

Electricity Failure at Birmingham.—A breakdown on the high-tension main occurred at the Summer Lane electricity generating station at Birmingham, on Monday of last week, with the result that the current was cut off in part of the district supplied from this station. Premises in the centre of the city were affected, and the trams in the Sparkbrook and Bordesley district were held-up for some minutes. The period of the disturbance varied, for it took some time to start-up the different sections; but, generally speaking, the delays were not so serious as they might have been.

Fire at the Sheffield Corporation Electricity Station.—A fire last Friday afternoon caused damage to the extent of nearly £4000 at the Corporation electricity sub-station in Ellin Street, Sheffield. The outbreak occurred in the transformer store. Suddenly flames shot up in one of the transformers, and in a few seconds spread to other objects in the store. The store forms the east side of a square of buildings belonging to the Corporation. Near by is an oil store, which would have been in danger had not the fire been discovered and subdued quickly. The top storey of the building was burnt out; but fortunately it was disused, and therefore empty. It is thought that the fire was caused by the overheating of one of the transformers.

York Gas Company.—The profit of the Company for the year ended Dec. 31 last amounts to £13,413; and with the sum brought forward, there is a total to the credit of profit and loss account of £19,442. After meeting fixed charges, and the payment of dividends of 4 p.ct. for the year on the preference stock and £4 4s. p.ct. for the year on the ordinary stock (both less tax), there will be a balance to carry forward of £5226. The Directors report that they have entered into a contract for an installation of vertical retorts, to replace the existing carbonizing plant; and towards the cost of this £15,000 has been provided in the accounts. The quantity of gas sold during the year was 3,071,575 therms; being equivalent to 639,911,000 c.ft. on the old basis of charge.

Lighting of Educational Institutions.—Some months ago the London County Council instructed the Education Committee to consider and report whether, "in the interest of economy, health, and convenience, electricity should be substituted for gas in schools where gas is already installed." The Committee now report that during the past two-and-a-half years they have received a number of applications from the managers of schools for the substitution of electric lighting for existing gas installations, but in view of the prevailing financial conditions have felt bound to decline them. It is, however, the Council's practice, as a general rule, to instal electric light in new and remodelled schools. The Committee have considered reports by the Council's officers on the relative merits of gas and electric lighting, but, bearing in mind the present financial situation, "are not prepared to recommend any action in the direction of substituting electric lighting for gas lighting in those schools at present illuminated by gas."

Walker and Wallsend Union Gas Company.—The revenue of the Company for the year ended Dec 31 amounted to £117,913, and the expenditure to £94,029, leaving a balance of £23,884 as the profit for the year. With the balance of undivided profits brought forward, there is a total sum at disposal of £27,910, which the Directors propose partially to appropriate in the payment of dividends already announced, and in placing to credit of the insurance fund £1600—leaving £13,581 to be carried forward. The report states that the revenue account for the year shows a decrease in the receipts, as compared with the previous year, of £4114, and in the expenditure of £23,893. The continued depression of trade has had effect in a further reduction in the output of gas during the year; but 635 new consumers have been connected. The saving in the cost of coal is notable. The price of gas was reduced to ordinary meter consumers from 1s. 1·2d. to 1s. per therm for the first three quarters of the year, and to 11d. per therm for the last quarter. The Directors have made a further reduction to 10d. per therm as from the meter readings at December last. The capital account shows an additional expenditure of £8891. Mortgage bonds to the extent of £45,820 have been issued during the year.

THE NORTH-EAST COAST COAL TRADE.

From Our Own Correspondent.

The week opened full of excitement on the Newcastle market, with almost panic conditions ruling, and quotations just anywhere. How much business was fixed up is hard to say; but it is probable that most buyers fought shy of the prices asked—anything up to 28s. for good gas coals, with practically nothing offering.

From the middle of the week onwards, there has been a distinctly steadier and healthier tone. It is said that very large quantities of coal have really been bought since the beginning of the year—a million tons for the German State Railways alone, according to one report. And buying at this rate could not go on for ever. Again, the prices quoted by collieries have brought America into the picture; and the fixing of a Newcastle collier, at present in the States, to take a U.S.A. cargo to Italy has been a sign of the times. On the whole, therefore, buyers have not been so willing even to consider anything in the way of fancy prices. The colliery position remains strong, and they are content to hold what coal they still have to spare for the second half of the year. Contracts for that position are more likely to be negotiable soon if the quieter tone continues. That the market is still very strong is shown by the fact that 25,000 tons of a certain good quality of coking unscreened have been sold, in the second half of the week, at 27s. 6d. for March-August.

Rumour has again been busy with one of the London gas companies, and the prices mentioned have once more been those quoted here last week. Nothing definite can be discovered. Nominal quotations at the end of the week are perhaps: "Wear Specials" 28s., best qualities 26s. 6d. to 27s., and seconds 25s. to 26s. Very little of anything is offering for this or next month, and forward business still is a matter for negotiation, with good qualities by no means anxious as yet to come down to buyers' ideas.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From a Local Correspondent.

The gas coal trade in Yorkshire and Lancashire remains firm. At Barnsley, where a large trade is done in gas coal, at the end of last week the inquiry for this class of fuel was stronger; but dry slacks were in good supply. The demand at this market for furnace coke was very active, and prices were decidedly firmer; up to 32s. per ton f.o.b. being quoted. At Sheffield, gas cokes, in sympathy with an upward movement of furnace and foundry coke, were firm. With regard to the coal trade generally in these counties, the condition of the market abroad has caused coals to be stiff in price, although this has not yet affected the gas coal market, nor does it appear likely to do so. The position in the Ruhr Valley has led to many rumours as to German requirements; but there is not much business so far. There has been much speculation on this side, and prices for export have risen. Collieries are showing an inclination to decline forward selling in view of the uncertainty of the immediate future. The mild weather tends to keep both the house and the gas coal trade quiet. The home demand generally shows considerable improvement; railway companies and factory owners seeking the full contract deliveries. This reduces the quantity available for export, in respect of which the demands are heavy, notwithstanding rising prices. In some quarters the prices of best steams have advanced 2s. to 3s. per ton; the new quotation being from 29s. to 30s. per ton, f.o.b.

COAL TRADE IN THE MIDLANDS.

From a Local Correspondent.

The week has seen a tightening-up of the market. Conditions are not what can be fairly called stringent, for business has been placed an the contract prices previously ruling. For small spot lots, however, most of the collieries have required better terms—in some cases 1s.; it others 2s. The counter attraction of the shipping trade has become more perceptible to buyers of gas coals from South Yorkshire and Derbyshire. Deliveries are being regularly made for the most part. There are exceptions, however; and the exceptions tend to increase, though delays are not at all serious. Some shortage of wagons was reported on 'change at Birmingham. Still, the transport services are working remarkably well according to general testimony. The movement of coal has been facilitated since the setting-free of rolling stock which had been diverted for the Christmas trade. Some of the gas undertakings are betraying anxiety regarding forward supplies. They would be willing to renew expiring contracts forthwith down to the summer of next year. Collieries prefer, however, to keep a free hand for the present. They cannot tell what the reactions of the Ruhr occupation may be; and until they can see their way more clearly, they are not disposed to enter into premature commitments.

South Staffordshire Mond Gas.—The twenty-second ordinary meeting of shareholders in the South Staffordshire Mond Gas (Power and Heating) Company is to be held on the 27th inst., when the accounts for the year ended Dec. 31 last will be submitted. In their report, the Directors state that, owing to the stoppages in industry during the year, and general shortage of trade in the district served by the Company, the quantity of fuel consumed, and gas made and distributed, was less than in 1921; but there was an increase in the output and sale of disinfectants and other products. The capital expenditure during the year was £246, bringing the amount overspent on this account to £3336. The gross profit for the year is £14,571; and deducting debenture and bank interest (£9394) leaves a net profit for the year of £5176. During the year the bank overdraft was reduced from £60,491 to £55,991. The Directors do not recommend the payment of a dividend on the preference shares. They announce that the Rt. Hon. Sir Alfred M. Mond, Bart., M.P., has accepted their invitation to rejoin the Board of the Company.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 5.

In the London tar products market, pitch continues the chief item of interest, and the price is firm at not below 140s. to 142s. 6d. per ton. Creosote is steady at about 8½d. per gallon, net in bulk at makers' works. Pure benzole and pure toluole are about 2s. to 2s. 3d. per gallon. Solvent naphtha, 95/160, is quiet at about 2s. per gallon. crystal carbolic acid continues in strong demand, and the price is steady at from 9¼d. to 9½d. per lb.

Tar Products in the Provinces.

Feb. 5.

The average values for gas-works products during last week were: Gas-works coal tar, 83s. 6d. to 88s. 6d. Pitch, East Coast, 140s. to 145s. f.o.b. West Coast—Manchester, 135s. to 140s.; Liverpool 136s. to 141s.; Clyde, 137s. 6d. to 142s. 6d. Benzole 90 p.ct., North, 1s. 7½d. to 1s. 8d.; crude 65 p.ct. at 120° C., 1s. 0½d. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 8½d. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 1s. 6d. to 1s. 8d. Creosote, in bulk, North, liquid, 7½d. to 8d.; salty, 6¾d. to 7¼d. Scotland, 6½d. to 6¾d. Heavy oils, in bulk, North, 7d. to 7¼d. Carbolic acid, 60 p.ct., 2s. 5d. to 2s. 7d. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

FROM A MARKET CORRESPONDENT.

Bye-Products Trade.

There is very little to report in these markets. The demand for pitch still continues and, if anything, prices are a shade dearer. Carbolic acid also is wanted. The supply of products generally is still small, but should improve, although some temporary set back in activity resulted from the action of the French in the Ruhr, which caused a heavy demand for coal from the Continent to the temporary detriment of our own industries.

The range of quotations is as follows:

Benzole: 90% London 1s. 8d., North 1s. 7d.

Crude Tar: 70s. to 72s. 6d. Refined tar, 40s. per barrel (free) on rail.

Pitch: London, 135s. to 140s. per ton; East Coast, 145s. per ton; West Coast, 120s. to 127s. 6d., with Manchester 122s. 6d. per ton, and Glasgow 125s. per ton; South Wales, 137s. 6d. per ton.

Solvent Naphtha: London, 1s. 8d. Provinces average 1s. 7d. per gallon.

Crude Naphtha: Naked, 9d. per gallon.

Heavy Naphtha: 1s. 9d. per gallon.

Naphthalene: Refined, £16; inferior, £14; crude, £4 to £7 10s., according to quality.

Toluole: Naked, 2s. North, 1s. 11d.

Creosote: London, 7½d.; North, 7¼d.

Anthracene: 40-45%, 4d. per unit per cwt.

Pyridine: 12s. per gallon.

Aniline Oil: 11d. per lb., drums extra.

Aniline Salts: 10d. per lb.

Cresylic Acid: 95%, 2s. 4d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 2s. 4d. per gallon; crystals 40%, 8d. to 8¼d.

Salicylic Acid: Technical, 1s.; B.P., 1s. 6d. per lb.

Xylol: Pure, 3s. 3d.; commercial, 2s. 6d. per gallon.

Sulphate of Ammonia.

This market has been firm with an active demand. It is probable that prices will again have to be raised for March to May deliveries.

Profitable Gas-Works at Milton Regis.—It was stated at a recent meeting of the Milton Regis Urban District Council by Mr. Down (who has been Chairman of the Gas Committee for the past few months), that the Council's gas undertaking was a veritable gold mine. Since the coal strike they had wiped-off a debt of £1000, spent £600 out of revenue on improving the works, and would be able to give the consumers a further substantial reduction in price at Lady Day.

Road Tarring and the Patent Fuel Industry.—Writing to "The Times," Mr. F. A. Gibson (the Secretary of the Monmouthshire and South Wales Coal Owners' Association) says that on one at least of the subsidiary industries of coal mining the effect of the wasteful use of coal tar and pitch in road construction has been very serious—namely, the patent fuel industry. Partly in consequence of the reduced production of tar, and partly as the result of the abnormal increase in the consumption of tar for road-making purposes, the price of pitch has advanced to phenomenal figures. The pre-war price was about 40s. delivered at works. Recently the price has been as high as 140s. to 150s. per ton; and the result of this increase in price has been an extremely acute depression. Consumers find it cheaper to buy large coal, and the industry of patent fuel making is threatened with extinction. He suggests that relief could be obtained by restrictions on the wasteful use of tar for road-making purposes, especially in county districts. There are substitutes available for this purpose, but none as a patent fuel agglomerant. The Patent Fuel Manufacturers' Association have made representations to this end to the Roads Department of the Ministry of Transport. If the patent fuel works are closed down, there will follow stoppages at many of the collieries. These evils, however, may be mitigated, if not avoided, by the conservation as far as possible of the existing supplies of coal tar for distillation to produce pitch for patent fuel manufacture.

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STOCK MARKET REPORT.

THE week opened dull on the Stock Exchange, and for the first half of it business was shy, with a good many weak spots. But on Thursday, the arrangement of the U.S.A. debt, and hopeful views as to Lausanne, cheered them somewhat, so that the close was fairly firm. Home Government issues were not much changed.

Business in the Gas Market was about on the scale which seems to have established itself as a seasonable standard, and the less conspicuous companies were not overlooked. In the London group, Gas Light maximum rose ½, and the two Commercials 1 each. Among the Provincials, British rose ½, and Newcastle preference 2. Continentals were not in favour; Imperial dropping 2, and Union 8½.

The following transactions in gas during the week were recorded: On Monday, British 35¼, Gas Light ordinary 92⅜, 92⅝, 93, 93¼, 93⅜, 94, ditto 3½ p.ct. maximum 64¼, ditto 4 p.ct. preference 78½, Hornsey 131½, Imperial Continental 153, 155½, Primitiva 5 p.ct. preference 51s. 3d., 52s. 6d., San Paulo 6 p.ct. preference 5⅞, South Metropolitan 94¼, 94½, 95¼, 95½, ditto preference 95½, ditto 3 p.ct. debenture 60, ditto 6½ p.ct. debenture 106, South Suburban 101, Swansea 7 p.ct. preference 104⅜, Tottenham 4 p.ct. debenture 76, 76½. On Tuesday, Alliance and Dublin 62½, Bombay 93s. 9d., 95s., Brentford "B" 99, 99½, British 35⅛, Commercial 4 p.ct. 96½, ditto 3 p.ct. debenture 56, European 8¼, 8⅜, Gas Light ordinary 91½, 92, 92¼, 92½, 93, 93⅛, ditto 3½ p.ct. maximum 64½, ditto 4 p.ct. preference 78½, 80, Imperial Continental 154, 154½, Liverpool 7 p.ct. preference 105, Monte Video 50, Primitiva 13s. 6d., ditto 5 p.ct. preference 51s. 3d., 52s., 53s. 1½d., San Paulo 6 p.ct. preference 6⅛, South Metropolitan 3 p.ct. debenture 60⅜, South Suburban 100, Tottenham "B" 101½. On Wednesday, Alliance and Dublin 62⅜, Bombay 95s., Brentford "B" 100, British 35, 35⅛, Buenos Aires 4 p.ct. debenture 55½, 56, Commercial 4 p.ct. 95⅜, ditto 3 p.ct. debenture 57½, Gas Light ordinary 91½, 92½, 92⅝, 93, 93⅛, ditto 3½ p.ct. maximum 63½, 64, 65, ditto 4 p.ct. preference 79, 80, Imperial Continental 155, Primitiva 13s. 6d., ditto 5 p.ct. preference 51s. 3d., 53s. 3d., 53s. 9d., South Metropolitan 95, South Suburban 99½, 100⅛, 100⅝, 101⅛, Tottenham "B" 101½, Wandsworth "B" 102, Romford 7 p.ct. "B" 8½, Woking 10 p.ct. "A" 70½, 71. On Thursday, Aldershot 5 p.ct. maximum "C" 77½, 78, ditto 4 p.ct. debenture 62½, Brentford "A" 99⅜, 100½, ditto 4 p.ct. debenture 76½, 77, Commercial 4 p.ct. 95½, Gas Light ordinary 92½, 93, 93⅛, 93¼, 93⅜, 93⅛, 94, ditto 3½ p.ct maximum 64, ditto 4 p.ct. preference 80, Hastings and St. Leonards 5 p.ct. 99½, Imperial Continental 154, Portsea "C" 97, Primitiva 13s., 13s. 1½d., 13s. 6d., ditto 5 p.ct. preference 50s. 3d., 51s. 3d., 51s. 9d., 52s., South Metropolitan 94½, Wandsworth, Wimbledon 99, ditto Epsom 102, Barnet "A" 118½, ditto "D" 89, North Middlesex 5 p.ct. preference 89. On Friday, Alliance and Dublin 63½, Commercial 4 p.ct. 95, ditto 3½ p.ct. 95½, Continental Union 25, Gas Light ordinary 93½, 93⅜, 93⅞, 94, 94⅛, 94½, 94⅝, ditto 3½ p.ct. maximum 64, 64½, ditto 3 p.ct. debenture 60½, 61, Hastings and St. Leonards 3½ p.ct, 77½, Imperial Continental 153½, Primitiva 5 p.ct. preference 50s., 51s. 3d., 51s. 6d., South Metropolitan 94⅛, 94½, 95¼, South Suburban 100½, Barnet "A" 119½, ditto "D" 89⅜, Brighton and Hove 5 p.ct. debenture 95, Gloucester cons. 79½, Wolverhampton 8 p.ct. debenture 106½, 107½, Danish 5½.

In the Money Market, there was an end of the superabundance which had marked the preceding week, and the tendency was subject to some amount of variation. The opening was quiet and steady; but in mid-week a demand sprang up which stiffened rates materially. Before the close, however, things had taken an easier turn. Discount terms were firm throughout; Treasury Bills lending a helping hand. Silver was pressed for sale by China, and fell to 30 13/16d. The Bank of England rate was 3 p.ct., as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS. LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
131,978	Stk.	—	—	—	Aldershot 5 p.c. max. C.	..	76–81	77½–78
182,049	,,	Aug. 24	4	4%	Do. 4 p.c. Pref.	..	68–73	
1,551,868	,,	Oct. 5	2½	5%	Alliance & Dublin Ord.	59–64	62–67	62½–63½
374,000	,,	Jan. 11	4	4%	Do. 4 p.c. Deb.	76–79	60–65	62½
180,000	5	Oct. 19	7½	4/–	Bombay, Ltd.	5¼–6¼	4½–5	93/9–95/–
100,000	5	Aug. 10	16	7½%	Bourne-mouth Gas and Water: 5 p.c.	..	11–12	...
383,110	10	,,	7	7%	Bourne-mouth Gas and Water: B 7 p.c.	15–15½	11–12	...
115,000	10	,,	6	6%	Bourne-mouth Gas and Water: Pref. 6 p.c.	13½–14	9–10	...
162,065	—	Dec. 29	—	4%	Bourne-mouth Gas and Water: 4 p.c. Deb.	..	71–76	...
992,045	Stk.	July 27	14	6t/–	Brentford A Consolid.	261–266	99–102	99½–100½
734,920	,,	,,	11	6t/3	Do. B New	204–209	99–102	99–100
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109–111	82–87	...
221,400	,,	Dec. 14	4	4%	Do. 4 p.c. Deb.	91–93	75–80	76½–77
214,775	,,	Aug. 24	11	11%	Brighton & Hove Orig.	208–213	165–170	—
244,200	,,	,,	8	8%	Do. A Ord. Stk.	154–159	120–125	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	..	95–96	...
530,000	20	Oct. 5	12½	22/6	British	44–45	34–36	35–35½
10,000	10	Dec. 29	—	7/–	Do. 7 p.c. Pref.	..	10½–11½	...
140,000	Stk.	June 29	4	4%	Do. 4 p.c. Deb. Stk.	88–90	75–80	
245,771	,,	Dec. 29	4	4%	Buenos Aires 4 p.c. Deb.	85–87	53–58	55½–56
100,000	10	Nov. 2	—	—	Cape Town & Dis., Ltd.	1½–2½	6½–7½	...
100,000	10	Oct. 19	—	—	Do. 4½ p.c. Pref.	4–6	6–7	...
100,000	Stk.	Dec. 29	4½	—	Do. 4½ p.c. Deb. Stk.	70–75	71–76	...
237,860	,,	,,	—	7½%	Cardiff 7½ p.c. Deb.	..	102–104	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108–110	..	...
1,513,280	,,	July 27	5/9/4	56/–	Commercial 4 p.c. Stk.	106–108	95–98	95–96½
560,000	,,	,,	5½	55/–	Do. 3½ p.c. do.	103–105	95–98	95½
475,000	,,	Dec. 14	3	3%	Do. 3 p.c. Deb. Stk.	69¼–71¼	55–60	56–57½
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76–79	17–23	25
200,000	,,	Dec. 14	7	3%	Do. 7 p.c. Pref.	115–118	55–60	...
660,000		Sept. 1	—	6%	Croydon sliding scale.	..	96–101	...
284,975		,,	—	5%	Do. max. div.	..	80–85	...
492,270	Stk.	—	6	4½%	Derby Con. Stk.	123–125	..	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102–104	..	...
209,000	,,	Oct. 5	—	5%	East Hull 5 p.c. max.	..	..	...
1,002,180	10	Jan. 25	10	5/0	European, Ltd.	17½–18	8–9*	8½–8¾
16,298,975	Stk.	July 27	4/17/4	52/–	Gas: 4 p.c. Ord.	98–102	93–95	91½–94½
2,600,000	,,	,,	3½	35/–	Gas: 3½ p.c. max.	76–79	63–68	63½–65
4,062,235	,,	,,	4	4%	Light and Coke: 4 p.c. Con. Pref.	96–99	77–80	78½–80
4,674,850	,,	Dec. 14	3	3%	Light and Coke: 3 p.c. Con. Deb.	72½–74½	59–62	60½–61
130,000	,,	Dec. 11	10	10%	Light and Coke: 10 p.c. Bonds	..	..	...
—	—	—	—	—	Light and Coke: 7½ p.c. Ilford Deb	..	..	...
82,500	,,	Sept. 21	5	65/7½	Hastings & St. L. 5 p.c.	..	95–100	99½
258,740	,,	,,	3½	50/7½	Do. 3½ p.c.	87–89	77–80	77½
70,000	10	May 18	11	7½%	Hongkong & China, Ltd.	16½–16¾	6–7	...
86,600	Stk.	Aug. 24	9	9%	Hornsey 7 p.c.	..	127–132	131½
1,976,000	,,	Nov. 16	9	4%	Imperial Continental	150–160	153–158	153–155½
404,800	,,	Aug. 10	3½	3½%	Do. 3½ p.c. Deb. Red.	84–86	76–79	...
235,242	,,	July 27	6½	6½%	Lea Bridge Ord. 5 p.c.	119–121	95–100	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.	..	..	...
600,000	,,	Sept. 21	—	7%	,, 7 p.c. Pref.	..	105–107	105
165,736	,,	Aug. 10	7/5/6	87/3	Maidstone 5 p.c.	..	87–92	...
63,480	,,	Dec. 29	—	3%	Do. 3 p.c. Deb	..	53–58	...
75,000	5	June 29	6	6%	Malta & Mediterranean Met. of Melbourne: 4½ p.c. Deb.	4¼–4½	3¼–4	...
250,000	100	Oct. 2	4½	4½%	Monte Video, Ltd.	99–101	97–100	...
541,920	Stk.	Nov. 30	4	4%	Newcastle & Gatsh'd Con.	11½–12	50–55	50
1,875,892	,,	July 27	4½	4½%	Do. 4 p.c. Pref. Stk.	98½–99½	83½–84½	...
98,125	,,	,,	—	4%	Do. 3½ p.c. Deb.	..	78½–79½	...
129,705	,,	Dec. 29	3½	3½%	North Middlesex 10 p.c.	82–83	68–69	...
15,000	10	Aug. 26	—	7/6	,, 7 p.c.	..	..	...
55,940	10	Aug. 24	7/14/0	7/8⅝	Oriental, Ltd.	14–15	10½–11½	...
300,000	Stk.	Nov. 30	8	8%	Plym'th & Stonh'se 5 p.c.	117–122	95–100	...
188,120	Stk.	Dec. 29	—	7/6	Portsea Island, B	..	91–96	...
60,000	50	Aug. 24	13	65/–	Do. C	128–131	100–105	...
100,000	50	,,	12	60/–	Primitiva Ord.	118–121	96–99	97
249,980	5	—	8	—	Do. 5 p.c. Pref.	5½–6	1⅜–1⅝	13/——13/6
499,960	5	—	5	—	Do. 4 p.c. Deb.	4½–5	2 1/16–2 1/8	50/——53/9
521,600	100	Nov. 30	4	4%	Do. ,, ,, 1911	91–93	68–73	...
600,000	Stk.	Jan. 25	4	4%	River Plate 4 p.c. Deb.	..	55–60*	...
346,198	,,	Dec. 29	4	4%	San Paulo: 6 p.c. Pref.	85–87	53–58	...
150,000	10	Sept. 21	6	6/–	San Paulo: 5 p.c. Deb.	10¼–11	5½–6½	5½–6½
125,000	50	July 3	5	5%	Sheffield A	47–49	35–38	...
135,000	Stk.	Aug. 24	10	5%	Do. B	223–224	97–99	...
209,984	,,	,,	10	5%	Do. C	222–224	97–99	...
525,500	,,	,,	10	5%	Shrewsbury 5 p.c.	220–222	97–99	...
133,201	Stk.	Sept. 15	4	4%	South African	..	..	...
90,000	10	Nov. 2	9	7%	South Met. Ord.	10¼–11½	7–9	...
6,609,895	Stk.	July 27	5/4/0	5%	Do. Red. Pref.	111–113	94–96	94½–95½
250,000	,,	Jan. 11	—	5%	Do. 3 p.c. Deb.	..	94–96	95½
1,895,445	,,	,,	3	3%	Do. 6½ p.c. Deb.	72½–74½	59–62	60–60½
734,000	,,	Sept. 7	—	6½%	South Shields Con. Stk.	..	105–107	106
224,820	,,	Aug. 24	8½	8½%	S'th Suburb'n Ord. 5 p.c.	157–159	108–110	...
1,087,795	,,	,,	6	6%	Do. 5 p.c. Deb. Stk.	114–116	98–101	99½–101½
298,337	,,	Dec. 29	5	5%	Southampton Ord.	116–118	93–98	...
647,740	,,	Nov. 2	5	7%	Do. 4 p.c. Deb. Stk.	99–102	80–83	...
121,275	,,	Dec. 29	4	4%	Swansea 7 p.c. Pref. Stk.	..	68–73	...
250,000	,,	Aug. 24	—	218	Do. 6½ p.c. Deb. Stk.	..	103–105	104½
200,000	,,	Dec. 29	—	202	Tottenham: A 5 p.c.	..	101–103	...
120,000	,,	July 27	—	7½%	Tottenham: B 3½ p.c.	135–138	112–117	...
782,275	,,	,,	6	6%	Tottenham: 4 p.c. Deb.	113–117	100–103	101½
181,255	Stk.	Dec. 14	4	4%	Tynemouth 5 p.c. max.	87–89	75–80	76–76½
236,476	Stk.	Aug. 24	5	2½%	Wandsworth, Wimbledon, and Epsom—Wandsworth A 5 p.c.	108½–109	79–81	...
30,000	,,	July 27	8½	72/6	Do. B 3½ p.c.	151–156	111–115	...
155,636	,,	,,	6½	57/6	Do. C.	129–134	100–105	102
108,275	,,	,,	—	50/9	New Ordinary	..	87–92	...
140,865	,,	,,	—	50/9	Wimbledon 5 p.c.	..	87–92	...
352,000	,,	,,	6½	53/9	Epsom 5 p.c.	117–122	95–100	99
98,000	,,	,,	6½	58/9	3 p.c Deb. Stk.	121–126	100–105	102
88,416	,,	Dec. 29	3	3%		66–69	56–59	...

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Newport (Mon.) Gas Company.—The Directors of the Company recommend a dividend on the consolidated stock at the maximum rate of 5 p.ct. per annum, and the transfer of £4000 from the profit and loss account to the reserve fund. In future, annual meetings of the Company are to be held, instead of half-yearly ones as heretofore.

Further Reduction in Price at Colchester.—The Directors of the Colchester Gas Company announce that the price of gas will be further reduced from the last (December) meter readings from 4s. 5½d. to 4s. 1⅜d. per 1000 c.ft. (from 11·4d. to 10·8d. per therm). This is a reduction of 3¾d. per 1000 c.ft., making a total reduction in twelve months of 1s. 4d. The price charged pre-war was 3s. per 1000 c.ft.

Cambridge Gas Cheaper.—The reduction in the price of coal and other costs of manufacture enabled the Directors of the Cambridge University and Town Gas Light Company to reduce the price of gas as from Midsummer last from 11·6d. per therm (equivalent to 4s. 7d. per 1000 c.ft.) to 10d. per therm (3s. 11½d. per 1000 c.ft.), and also to make a further reduction as from Christmas from 10d. to 9d. per therm (equivalent to 3s. 6⅜d. per 1000 c.ft.). In submitting the accounts for the past year, the Directors recommend the payment of the usual dividends.

Theft from a Slot-Meter.—At the Wellington (Salop) Police Court, William Mapp pleaded guilty to stealing from a slot-meter, the property of the Wellington Gas Company. Mr. A. E. Parker (Sub-Manager to the Company) said the estimated damage to the meter was £1 15s., and £1 1s. 6d. had been taken. Defendant pleaded he was an iron-worker out of work, and had several children. Mr. R. A. Newill stated that the Company did not wish to press the case. They only desired that such offences should cease. The defendant was fined £5, including the damage done to the meter.

Aldershot Gas, Water, and District Lighting Company.—The accounts for the year ended Dec. 31, to be presented at the meeting next Friday, show that the revenue from all departments was £189,004, and the expenditure £153,311, leaving a surplus of £35,693. The Directors recommend that the full statutory dividends be paid—all less income-tax. Owing to the very mild autumn, the sales of gas show but a modest increase (0·6 p.ct.). Since the termination of the coal strike (Midsummer, 1921), the price of gas has been reduced in the different areas by 3d. per therm (1s. 3d. per 1000 c.ft.) and by 3·6d. per therm (1s. 6d. per 1000 c.ft.). It is hoped to make further reductions during the present year. Sales of electricity for the year show an advance of 14·1 p.ct.

Cheadle Gas-Works Ownership.—A public meeting was held last week to consider the question of the purchase of the local gas-works by the Cheadle Rural District Council. Dr. Mackenzie presided, and explained that negotiations had been proceeding since June, with the result that the price now offered for the works, subject to the approval of the Ministry of Health, was £7500. In addition, an expenditure of £600 was required to supply the existing consumers with better gas than they had had for the past few years, and for incidental outlays. The accounts of the Company for the twelve months ended June 30 showed a profit of £335, without allowing anything for depreciation; and an estimate had been made which indicated that it was possible, by the more efficient state of the works and the lower price of coal, to effect a saving of £410 per annum. These figures were based on the present number of consumers, which, he ventured to say, should go up 100 p.ct. if the Council bought the works. The expert they had consulted was perfectly satisfied that it could be made a paying concern. The proposal to purchase was approved.

Irish Gas-Works Troubles.—Several Irish gas-works have been gravely affected by the lamentable conditions prevailing in the Free State territory. The political disturbances react in one form or another on sections of workers, and discontent leads to action that causes general inconvenience. An instance in point was at Waterford, where a dispute between members of the Irish Transport and Dockers' Union as to the right to trim coal caused a strike at the gas-works, holding-up the city supply. The strikers put on a bold front, took possession of the works, deposed the Manager, hoisted the red flag, and assumed entire control. A statement issued by Mr. R. B. Anderson (the General Manager) is to the effect that until the works are restored, the Company cannot be responsible for the maintenance of the supply. Consumers through slot-meters are cautioned not to allow any person to remove money from the meters. While the supply was interrupted at the beginning of the strike, there would appear to have been a normal service under the workers' system of operation; but, of course, matters cannot continue in this way. In Tralee a crisis in gas affairs has been created by the destruction of gas-engines. Late at night a party of armed men entered the gas-works, held-up the men on the night shift, and, with sledges, smashed the two engines that worked the exhausters. The town was in darkness; and bakeries and other industrial concerns dependent on gas power were crippled.

Malton Gas Company.—The report of the Directors for the half year ended Dec. 31 states that there had been a decrease in the sale of gas compared with the corresponding half year. The balance of profit amounts to £2645, an increase of £627. This has enabled the Directors to reduce the price of gas by 0·8d. per therm, equal to 4d. per 1000 c.ft.; and it is hoped the position will warrant a further reduction soon. The amount available for dividend, including the balance brought forward, is £3269, from which the Directors recommend the payment of 5 p.ct. for the half year, free of tax, which will absorb £1200.

Mr. Sandeman on the Newspaper Outcry.—In the columns of the "Croydon Advertiser," Mr. W. J. Sandeman, Distributing Engineer to the Croydon Gas Company, has proved himself an able exponent of the case for gas. In the course of a lengthy and forceful article, he shows that there is not the slightest justification for the Press activity against gas. The whole matter, he truly says, is grossly exaggerated; and, in many respects, the true aspects of the question have been withheld from, or erroneously conveyed to, the minds of the public. The therm has been wrongfully blamed, principally because no endeavour has been made on the part of many people to understand it.

Reduction in Price at Darlington.—At the quarterly meeting of the Darlington Town Council, a report of the Gas Committee was adopted recommending a reduction in the price of gas by 5d. per 1000 c.ft. It was also agreed to accept the tender of the Whessoe Foundry for supplying and erecting a new gasholder. Alderman Dixon said the reason they had been able to make a reduction in the price of gas was largely because of the higher prices that were being obtained for tar on the Continent, where there was a shortage. The price of this commodity had made a difference in the estimate of something like £4000. Other things also had gone in their favour; and it was hoped that the reduction would not only be for the quarter, but would continue during the year. If, however, in the autumn they had to pay considerably more for coal, they might be obliged to reconsider the position.

Nottingham Gas-Workers' Grievances.—Mr. A. Hayday, M.P. for the Western Division of Nottingham, in which the largest carbonizing works of the Corporation are situate, presided at a recent meeting of gas-workers in the city, when grievances as to wages affecting 600 of the men were discussed. It was determined to forward a communication to the Gas Committee strongly protesting against the manner in which a petition presented by the employees had been dealt with. It was also intimated that, unless the matter was satisfactorily settled at the next meeting of the Committee, the National Joint Council for the industry and the General Council of the Workers' Union will be notified of the differences which exist. A report was presented by members of a deputation which waited upon the Gas Committee on Oct. 23 in support of a petition requesting readjustment of anomalies in rates of pay. Mr. Hayday complained that the loyalty displayed by the men in not forcing a rectification of these anomalies during the war period did not seem to have been appreciated by the Gas Committee.

At a recent meeting of the Oswaldtwistle Urban District Council, Mr. J. Davies (the Gas Manager) submitted a report on trunk main extensions, and it was decided that application be made to the Ministry of Health to borrow £3550 for the work.

Damage to the extent of some £30 was done by a gas explosion last week at the house of a contractor at Guiseley, while workmen from the Yeadon and Guiseley Gas Company were engaged on repairs in the basement. One of the men, it is stated, struck a light in order to test a joint near the meter, and the explosion threw a man violently to the ground; but he received no injury beyond considerable shock.

Two men were hurt—though it is not thought that in either case the injuries are serious—by an explosion on an experimental plant for making hydrogen at the works of Tully Gas Plants, Ltd., Newark-on-Trent, on Tuesday of last week. The apparatus in connection with which the explosion took place was not the ordinary gasification plant, such as the firm supply to gas-works. It related to an entirely new idea being experimented upon by Messrs. Tully in conjunction with another firm for a commercial purpose.

About 260 persons attended a successful whist tournament and dance at Hull, in connection with the British Gas Light Company's Cricket Club; Mrs. Copp (the wife of the President) presenting the prizes to the successful players. During an interval between the dances, Mr. Harold E. Copp, the Company's Engineer at Hull, presented gold medals to Messrs. D. R. Hughes and W. Mawer, who held the Club's cups in 1921, and one to Mr. C. W. Appleton, whose name appears on the First Eleven cup for seasons 1916-17-18, when he organized teams to provide games for military sides who were stationed in and around Hull. The President said the Club was entering upon its twentieth season, during the whole of which time Mr. C. W. Appleton had acted as Hon. Secretary.

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